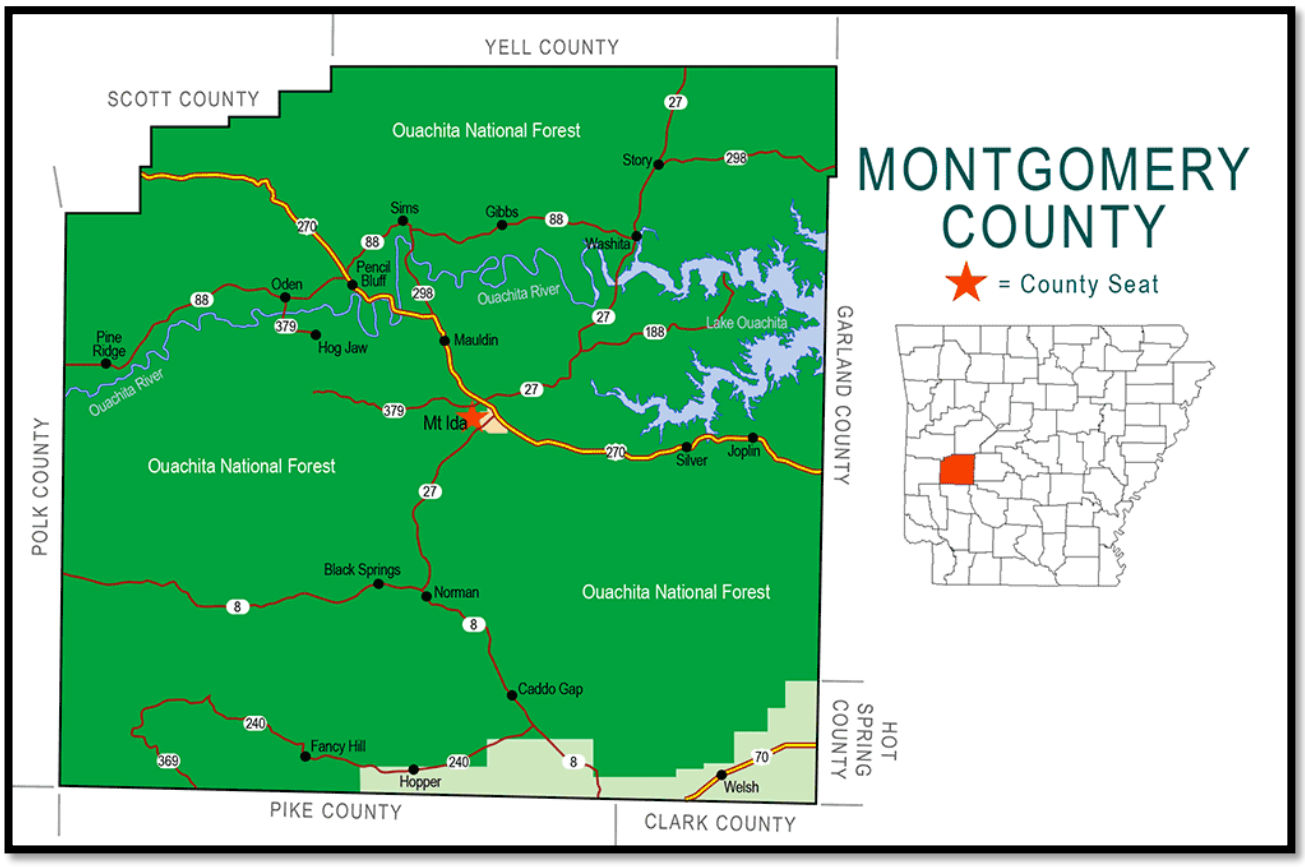
2024 Montgomery County Hazard Mitigation Plan

EMT-2021-BR-133-0013

Awarded September 6, 2022



MAP CREATED BY MIKE KECKHAVER

Prepared By:
West Central Arkansas Planning and Development District
1000 Central Ave.
Hot Springs, AR 71902

Table of Contents

SAMPLE ADOPTION RESOLUTION

SAMPLE RESOLUTION

RESOLUTION NO. _____

A RESOLUTION OF (LOCAL GOVERNMENT) ADOPTING THE (TITLE AND DATE OF MITIGATION PLAN)

WHEREAS the (local governing body) recognizes the threat that natural hazards pose to people and property within its jurisdiction; and

WHEREAS the (local government) has prepared a multi-hazard mitigation plan, hereby known as (title and date of mitigation plan) in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS (title and date of mitigation plan) identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in its jurisdiction from the impacts of future hazards and disasters; and

WHEREAS adoption by the (local governing body) demonstrates its commitment to hazard mitigation and achieving the goals outlined in the (title and date of mitigation plan).

NOW THEREFORE, BE IT RESOLVED BY THE (LOCAL GOVERNMENT), (STATE), THAT:

In accordance with (cite legal rule for adopting resolutions), the (local governing body) adopts the (title and date of mitigation plan). While content related to (local government) may require revisions to meet the plan approval requirements, changes occurring after adoption will not require (local government) to re-adopt any further iterations of the plan. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of (local governing body) this _____ day of ___,_____.

Mayor: _____

Clerk: _____

SECTION 1 INTRODUCTION

1.1 General Description

Hazards are part of the world around us. The occurrence of floods, hurricanes, tornadoes, winter storms, earthquakes, wildfires, and other hazardous events are inevitable. These hazards are natural phenomena we cannot control. These events damage the ecological environment. Despite their destructiveness, these occurrences are part of the natural system.

The natural environment is recuperative and can regenerate with resiliency. It is when manmade environments intersect with these natural phenomena that disasters result. Disasters occur when human activity, such as buildings, infrastructure, agriculture, and other land uses take place in the path of the forces of nature. The man-made environment is not as recuperative as the natural one. The consequences could mean damage and hardship for entire communities for years to come.

While we cannot prevent natural hazards, we can take some measures to reduce some of their adverse consequences. We have tools and techniques which, when put into effect in a timely fashion, allow us to avoid the worst-case scenario when a hazard does occur. By managing a community's capabilities and infrastructure before a hazardous event occurs, we can mitigate many of the negative impacts of a disaster. This reduces the magnitude of an event.

Hazard mitigation is the cornerstone of emergency management. It is defined as any sustained action to reduce or eliminate long-term risk to life and property from a hazard event. Mitigation encourages long-term reduction of hazard vulnerability. The goal of mitigation is to save lives and reduce property damage.

In the past, federal legislation has provided funding for disaster relief, recovery, and some hazard mitigation planning. The Disaster Mitigation Act of 2000 (DMA 2000) is the latest legislation to improve this planning process. DMA 2000 amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act by repealing the previous Mitigation Planning section (409) and replacing it with a new Mitigation Planning section (322). This new section emphasizes the need for State, Tribal, and local entities to closely coordinate mitigation planning and implementation efforts. The new legislation reinforces the importance of mitigation planning and emphasizes planning for disasters before they occur. As such, this Act establishes a pre-disaster hazard mitigation program (PDM) and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). It also requires communities to have an approved hazard mitigation plan to receive Stafford Act assistance, excluding assistance provided pursuant to emergency provisions.

The goals of this Montgomery County Hazard Mitigation plan are:

1. Reduce the potential for loss of life, injury and economic damage created by exposure to natural hazard for residents of the planning area due to natural disasters.
2. Provide a framework and coordination to encourage all levels of government, public/private organizations, and other participants to undertake mitigation to minimize potential disasters and to employ mitigation in the recovery following disasters.
3. Seek grants for mitigation projects through State and Federal funding.
4. Protect existing properties from natural disasters.

Whole community approach to mitigation has specific planning objectives to minimize damage due to disasters. These five specific objectives are:

1. Identify, describe, and characterize the natural hazards to which Montgomery County is susceptible,
2. Assess the risk of each hazard including probability and frequency, exposure, and consequences,
3. Examine feasible mitigation opportunities appropriate for the identified hazards and prioritize those opportunities,
4. Implement mitigation actions to reduce loss of lives and property, and
5. Identify mitigation opportunities for long-range planning consideration.

The Montgomery County Hazard Mitigation Plan has been developed to assess the ongoing natural hazard mitigation activities in Montgomery County. It evaluates additional mitigation measures that should be undertaken and outlines a strategy for implementation of mitigation projects. This Hazard Mitigation Plan is multi-jurisdictional with a planning area that includes all incorporated and unincorporated Montgomery County including the cities and municipalities of; Black Springs, Mount Ida, Norman, Oden. It also includes the School Districts; Caddo Hills, Mount Ida, and Oden (Ouachita River Campus).

Formal adoption and implementation of a hazard mitigation plan presents many benefits to Montgomery County and its residents. By identifying problems and possible solutions in advance of a disaster, the Planning Area will be in a better position to obtain pre- and post-disaster funding. Specifically, the Disaster Mitigation Act of 2000 establishes a pre-disaster hazard mitigation program and new requirements for the national post-disaster Hazard Mitigation Grant Program (HMGP). It requires states and communities to have a FEMA approved hazard mitigation plan in place prior to receiving post-disaster HMGP funds. Adoption of this hazard mitigation strategy will also increase Montgomery County's eligibility for assistance from FEMA's Flood Mitigation Assistance (FMA) program. The Planning Area will also gain additional credit points under FEMA's Community Rating System (CRS) program. This program provides discounts on National Flood Insurance Program (NFIP) flood insurance premiums for residents of communities who voluntarily participate in this program. Most importantly, Montgomery County will be able to recover faster and more wisely from a disaster. Through planning and acting on local mitigation strategies, Montgomery Counties communities will reduce vulnerability to disasters and identify opportunities for mitigation. In addition, the communities may meet comprehensive planning requirements and achieve community goals.

This update includes information pertaining to disasters that have impacted the Planning Area since the last revision. This document helps in obtaining information to better mitigate hazards in areas within the county that are prone to certain disasters. This plan is an update of the 2017 FEMA approved Montgomery County Hazard Mitigation Plan. The priorities of the 2024 Montgomery County Hazard Mitigation Plan remain consistent with the 2017 FEMA approved Montgomery County Hazard Mitigation Plan. The priorities of the county have not changed.

1.2 Parts of the Plan

The Montgomery County Hazard Mitigation Plan is divided into sections. These sections are created to address FEMA requirements that became effective April 19, 2023.

1. Element A: Planning Process
2. Element B: Hazard Identification and Risk Assessment
3. Element C: Mitigation Strategy
4. Element D: Plan Maintenance
5. Element E: Plan Update
6. Element F: Plan Adoption
7. Element G: High Hazard Potential Dams
8. Element H: Additional State Requirements/Supporting Documentation

This Hazard Mitigation Plan is multi-jurisdictional with a with a planning area that includes all unincorporated Montgomery County and municipalities; Black Springs, Mount Ida, Norman, Oden, including the School Districts; Caddo Hills, Mount Ida, and Ouachita River.

All jurisdictions and school districts listed above actively participated in the planning process from its inception. Each jurisdiction provided a representative to participate on the planning team or if a representative was unable to attend, they chose to be represented by the Montgomery County Office of Emergency Management. Planning team members actively participated in meetings, solicited input from members of their communities, and ensured that all jurisdiction information was reflected in the plan.

1.3 Involvement of Local Governments

Montgomery County's mitigation planning process was initiated September 6, 2022, when the County, through the efforts of the Montgomery County Office of Emergency Management (OEM), was awarded a Hazard Mitigation Grant Program (HMGP) grant by FEMA through ADEM, under Montgomery County Judge Jimmy Hart. Montgomery County negotiated a subcontract with West Central Arkansas Planning and Development District to facilitate their mitigation planning efforts. West Central Arkansas Planning and Development District served as facilitator. David Kimball, Director of the Montgomery County OEM, led the planning effort.

Once all participants in the Planning Area under the responsibility of the Montgomery County OEM formally agreed to participate, an initial planning team comprised of representatives from the Planning Area was organized.

This initial team was instructed to solicit interested people from their communities to participate on the planning team. This solicitation led to the addition of several planning team members. The planning team members include representatives from County government, local governments, city governments, public works officials, emergency management officials, fire districts, school districts and nonprofits.

All participating jurisdictions actively participated in the planning process. This participation was performed by soliciting input from communities in the Planning Area and participation in meetings. If a city or school district could not attend a meeting, Montgomery County OEM David

Kimball represented them. Also, all minutes and materials were mailed/emailed out to the jurisdiction representatives that could not attend. Communication was followed up by phone and email by David Kimball Montgomery County OEM and Kristin Cawyer at West Central Arkansas Planning and Development District.

The Planning Teams main discussion topics with WCAPDD were:

- Discussion on what mitigation is and how it benefits the Planning Area
- Risk for the Planning Area
- Past hazard occurrences
- Mitigation actions/plans
- Ongoing/future mitigation projects

Five planning events were scheduled throughout the planning process.

- Pre-Planning Meeting October 25, 2022
- Kick-Off Meeting December 6, 2022
- Planning Meeting September 28, 2023
- Planning Meeting December 14, 2023
- Mitigation Strategy Meeting February 26, 2024

All five meeting dates, time, place, and reason were advertised in the newspaper, on social media and on the West Central Arkansas Planning and Development District website. These meetings allowed us to:

- Define mitigation and establish the Planning Area
- Organize a consistent Planning Team
- Assess capabilities
- Engage the community
- Assess the risks for the Planning Area using the results from the Natural Hazards Questionnaire and the National Risk Index
- Identify specific vulnerable populations
- Discuss mitigation actions from the 2017 Hazard Mitigation Plan and identify what had been completed.
- Develop new mitigation actions
- Develop new mitigation plans/future projects
- Determine how the Planning Team will maintain the Hazard Mitigation Plan once it is adopted.

Technical assistance and training were provided to WCAPDD by the Arkansas Department of Emergency Management and FEMA. Both entities discussed the importance of incorporating whole community into the process. Guidelines for the mitigation plan were outlined in FEMA Local Mitigation Planning Policy Guide FP 206-21-0002.

A whole community approach to mitigation planning was encouraged. According to FEMA a whole community approach is one that attempts to engage the full capacity of residents, emergency management, government (local, tribal, state, territorial and federal), private and nonprofit sectors. This includes businesses, faith-based organizations, and disability organizations. A whole community approach to mitigation provides people of the planning area a more informed and

shared understanding of the community's risk, needs and capabilities. This approach empowers the whole community and allows for resources to be effectively used. Using a whole community approach to mitigation planning paves a path to the planning areas stability and resilience.

1.4 Neighboring Community Involvement

During the Mitigation Planning Process neighboring communities, State and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development were informed of planning meetings. They received a personal invite by the Montgomery County OEM to attend these meetings. Representatives from Arkansas Department of Emergency Management (Layce Blake, Jennifer Oakley). Perry County Office of Emergency Management (Dennis Ball) attended in person. The Montgomery County Coordinator, David Kimball, was brought into the discussion to help prioritize hazards and mitigation projects for the Planning Area. The knowledge and experience of other emergency managers was beneficial during the planning process. However, at this time Montgomery County does not have any formal MOU with neighboring counties. David Kimball is a new OEM and will be working to adopt these over the next five years as needed.

SECTION 2 PLANNING PROCESS

2.1 Planning Process

The Planning Process consisted of the following items:

- Once the initial planning meeting was held, Planning Committees were formed. These committees were divided by county/city/municipality. Everyone was encouraged to participate in their committee and invite others to join often. Montgomery County OEM was in charge of organizing and overseeing these committees. Montgomery County OEM was responsible for collecting data and documentation from committees and sharing them with West Central Arkansas Planning and Development District (WCAPDD).
- Montgomery County Judge engaged West Central Arkansas Planning and Development District (WCAPDD), the regional planning organization, to provide staff support in conducting the planning process and preparing the plan.
- Meetings were held with committee members to understand and agree on the planning process. The steps required for the planning process include organizing resources, assessing hazards, developing a mitigation plan, implementing the plan, and monitoring progress.
- WCAPDD staff attended workshops presented by FEMA and ADEM on the preparation of the mitigation plan.
- WCAPDD staff had numerous subsequent discussions about the planning process with ADEM staff.
- The WCAPDD staff discussed planning process issues with others in the state that were involved in the preparation of other hazard mitigation plans such as neighboring Counties and other Planning and Development Districts.
- Natural Hazard Mitigation Questionnaires were distributed and a total of 23 were returned. The natural hazards that the public seemed most concerned about were thunderstorms and extreme heat. A copy of the Natural Hazards Questionnaire and the results collected are in the Supporting Documents section of this plan. The Natural Hazards Questionnaire will be available year-round at the public library, County social media, and WCAPDD website. The questionnaire is a google form. The google form provides easy access to anyone with a cellphone or computer. The information will be collected/documented in the next update.
- Mitigation actions were created using the data from the Natural Hazards Questionnaire by the planning team

The Planning Committee utilized these technical documents:

- Arkansas Hazard Mitigation Plan: used as a guidance tool for past occurrences and risk assessments.
- Montgomery County Land Use Plan: used to prevent land-use conflicts during developing mitigation actions.
- Montgomery County Emergency Operations Plan: used to better understand how Montgomery County responds to emergencies and disasters while providing for the safety and welfare of its citizens. Plan provided information about critical facilities in the County.

- WCAPDD Comprehensive Economic Development Strategy: used to review Disaster and Resiliency procedures from natural disasters that helped during the mitigation actions process.
- Montgomery County Arkansas Continuity of Operations Plan: utilized in the capability assessment to incorporate how the departments and agencies in Montgomery County continue the operations of their essential functions under a broad range of circumstances including all-hazard emergencies natural, man-made, technological threats and national security emergencies

Timeline Of Events		
Date	Meeting Information	Attendees
September 6, 2022	No meeting EMT-2021-BR-133-0013 Mitigation Grant Awarded	• Sammy Jones Montgomery County Judge
October 25, 2022	No meeting. Information sent by email. Participation letter agreeing to participate and adopt the Montgomery County Hazard Mitigation Plan was discussed and signed.	• Sammy Jones Montgomery County Judge • Kristen Lancaster (WCAPDD) • Jerry Elizandro OEM
December 6, 2022	Kick Off Meeting Each person who attended received a workbook containing a copy of the Power Point "Overview of the Mitigation Planning Process". The Power Point was presented, and then the floor was opened up for a question-and-answer session. Questionnaire was handed out and everyone was encouraged to share it with the public.	• Sammy Jones Montgomery County Judge • Jerry Elizandro OEM • Kristen Lancaster (WCAPDD) • Jennifer Oakley (ADEM) • Lacye Blake (ADEM) • Jo Chisum City of Mt. Ida • Jean Whisehut • Vance Wright • Machele Wright • Barry Craw Mt. Ida Fire Department • Susan Campbell Montgomery County Judges office • Tammy Whisehut Mayor of Norman • Deric Owens Caddo Hills Superintendent • Bill Barnes Joplin FD Chief

Timeline Of Events		
September 28, 2023	Given recent staff turnover for both the County and WCAPDD, coupled a substantial lapse since the previous Planning Meeting, it was imperative for both entities to convene and devise a strategy for advancing the update process. Through deliberation, a plan was outlined to engage public interest and participation while efficiently gathering requisite data to facilitate the update for the Mongomery County Hazard Mitigation Plan.	• Judge Bart Williams • Kristin Cawyer (WCAPDD) • David Kimball (OEM)
December 14, 2023	Due to staff changes (both for the county and WCAPDD), the amount of time that passed, it was important to conduct a public meeting where the community could attend. Invites were sent out via email and phone calls. The meeting date, time, place, and reason were advertised in the newspaper, social media and on the West Central Arkansas Planning and Development District website. This meeting allowed us to: • Define mitigation and establish its purpose for the Planning Area • Discuss the purpose of updating the County Hazard Mitigation Plan • Organize a consistent Planning Team • Define and assess capabilities • Engage the community This meeting was followed up with an email containing a Capabilities Assessment form to be filled out and returned.	• Judge Bart Williams • David Kimball OEM • Ryan McPherson EM Deputy • Kristin Cawyer WCAPDD • Laura Wagner MT Ida Pharmacist • Pat Smith- Food Pantry • Robert Alexander • Larry Jones-President of McFair Association • Deric Owens Superintendent of Caddo Hills School District • L. Doughty Station Manager for KPG95.1 • Echo Donahou MCAL Admin Nurse • Gerald Hewitt County Extension Agent University Department of Agriculture • Patricia Carmad- American Legion/ Oden Schools
February 26, 2024	• Mitigation Strategy Meeting • Planning meeting • Mitigation Strategy/Risk Assessment • This meeting was advertised in the newspaper. Emails and phone calls to the entire planning team were made prior to meeting time. • Risk assessment using the Natural Hazard Questionnaire and the National Risk Index	• Kristin Cawyer (WCAPDD) • Courtney Decker (WCAPDD) • David Kimball (OEM) • Ryan McPherson EM Deputy • Judge Bart Williams

Timeline Of Events		
	were discussed. There were no questions or discussion from attendees. • Mitigation actions in the plan were reviewed to identify if actions were completed, ongoing or no longer applicable. • Mitigation plans were discussed, and the floor was open to discussion for new mitigation projects. • Items that were discussed consist of: • Retrofitting structure and facilities to minimize damage from high winds, earthquakes, floods, wildfire, or other natural hazards. • Development of initial implementation of vegetative management programs. • Construction of safe rooms for public and private structures meeting FEMA construction criteria in FEMA 320 "Taking Shelter from the Storm" and FEMA 361 "Design and Construction Guidance for Community Shelters" • Safe rooms were the largest topic of discussion. Many safe rooms are located in schools. During school hours they are only for the school children while those in nursing homes and day care centers are left vulnerable. • Procedure for keeping the Hazard Mitigation Plan updated was documented.	• Garry Craw Mt Ida Fire Dept Chief • David Kirddee Caddo Hills School • Vann Morgan Mayor of Mt. Ida
Those not in attendance for public meetings were represented by the Montgomery County OEM David Kimball. Information from the meeting was followed up by email/phone conversation.		

Prevention actions were updated:

- Zoning codes limiting development in a floodplain, open space preservation, and development of parks and recreation areas in hazard prone areas.
- Land development regulations such as requiring large lot sizes to ensure a minimum amount of impervious surface area.
- Storm water management regulations requiring retention/detention basins and clearing of ditches.
- Capital improvements planning preventing extension of public infrastructure into hazard areas.
- Building or fire codes requiring certain types of roofing or sprinkler systems

Property Protection actions addressing individual buildings were addressed and updated such as:

- Acquisition
- Relocation
- Retrofitting
- flood proofing
- installing structures such as piles and retaining walls
- grouting rock joints and fissures

Public Education and Awareness actions:

- Provide hazard maps with specific hazard information.
- Develop websites making hazard information publicly available.
- Implement outreach programs providing hazard and mitigation information to the public.
- Asking business owners to provide mitigation information to employees.
- Mailouts about hazards
- Newspaper articles
- Designing education programs for school age children and adults

Natural Resource Protection actions:

- erosion and sediment control programs
- wetland protection programs
- expanding public open space
- environmental restoration, and freshwater/sediment diversion programs)

Emergency Services Protection actions:

- emergency services before, during and immediately after an occurrence such as protection of warning system capability
- protection or hardening of critical facilities (fire stations and hospitals)
- protection of infrastructure (roads needed for emergency response)

Structural Projects actions to control the hazard including:

- reservoirs
- levees
- floodwalls
- other stormwater diversions.

2.2 Public Review

After the completion of planning meetings, the draft plan was provided for the public viewing. Copies of the draft were placed in the Montgomery County public library and the Montgomery County Courthouse. The draft can be found online on Montgomery County social media page, WCAPDD social media page, and on the WCAPDD website. The goal was to reach as many community members as possible for public comment before submission to the Arkansas Department of Emergency Management. THIS WILL BE COMPLETED AFTER PUBLIC REVIEW PERIOD.

2.3 Plan Developers

The following individuals participated in the plan development for their jurisdictions.

Developers and Planning Activities	
Jurisdiction	Name of Participation/Involvement
Montgomery County, unincorporated areas, State Agencies, and neighboring counties	County Judge Sammy Jones and County Judge Bart Williams – Represented Montgomery County. Received hazard mitigation workbook, attended planning meetings, completed questionnaires, and provided information on disasters. Participated in phone calls, emails, and other correspondence. Montgomery County Office of Emergency Management; Jerry Elizandro OEM, David Kimball OEM, Ryan McPherson Deputy OEM All members of CCOEM received hazard mitigation workbooks, attended planning meetings, completed, and distributed hazard questionnaires, participated in collection of historical natural disasters information. Participated in phone calls, emails, and other correspondence with facilitator and school districts, cities, and fire departments. Arkansas Department of Emergency Management; Lacye Blake and Jennifer Oakley; Received hazard mitigation workbook, attended first planning meeting. Addressed questions from planning team about hazard mitigation and assisted in transition between Kristin Lancaster and Kristin Cawyer. Arkansas Forestry Commission; Olivia Standridge assisted with wildfire risk/vulnerability
City Of Black Springs	Mayor Linda Gaston; Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.
City of Mount Ida	Mayor Vann Morgan; Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.
City of Norman	Mayor Tammy Wisenhunt Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.

Developers and Planning Activities	
City of Oden	Mayor Tim Philpot Attended planning meetings, completed community capabilities assessment and natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion of historical storm events.
Caddo Hill School District	Superintendent Deric Owens Attended planning meetings, received hazard mitigation workbook, completed inclement weather questionnaire for school district, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.
Mount Ida School District	Superintendent Tristan Knoedl Attended planning meetings, completed capabilities assessment, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.
Ouachita River- Oden Campus	Superintendent Jerral Strasner, Attended planning meetings, received hazard mitigation workbook, completed inclement weather questionnaire for school district, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.
Arkansas University Department of Agriculture	Gerald Hewitt Attended planning meetings, received hazard mitigation workbook, completed, completed natural hazards questionnaire assisted with Risk Assessment, and participated in open discussion of historical storm events.
Private Sector	Laura Wagner: Pharmacist, Robert Alexander, Larry Jones, Len Doughty KPGC95.1, Attended planning meetings, completed natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion
Non-Profit	Pat Smith-Food Pantry Attended planning meetings, completed natural hazard questionnaires, received hazard mitigation workbook assisted with Risk Assessment, and participated in open discussion
West Central Arkansas Planning and Development District	Kristen Lancaster, Program Manager with WCAPDD, served as the facilitator in the update of the Montgomery County Hazard Mitigation Plan. She met and held telephone conferences with school districts, cities, and county members to discuss the mitigation plan process and the HMGP, BRIC, and the FMA grant programs. She contacted local jurisdictions and schools to gather information thru the planning process. April of 2023, these duties were transferred to Kristin Cawyer of WCAPDD who completed the planning process and update. In February of 2024 Courtney Decker joined the WCAPDD team.

Points of Contact		
Judge Bart Williams Montgomery County 105 Highway 270 East Mount Ida, AR 71957	Montgomery County OEM David Kimball 105 Highway 270 East Mount Ida, AR 71957	City of Black Springs Mayor Linda Gaston 1111 Hwy. 8 West, Norman BLACK SPRINGS, AR 71960
City of Mount Ida Mayor: Vann Morgan P.O. Box 239 MOUNT IDA, AR 71957	City of Norman Mayor: Tammy Whisenhunt P.O. Box 427 NORMAN, AR 71960	City of Oden Mayor Tim Philpot P.O. Box 130 ODEN, AR 71961
Caddo Hill School District Supt. Deric Owens P.O. Box 130 ODEN, AR 71961	Mount Ida School Supt: Tristan Knoedl 338 Whittington Mount Ida, AR	Ouachita River – Oden Campus Supr. Jerrall Strasner P.O. Box 150 Oden, AR 71961

2.4 Plan Maintenance

This plan is a blueprint for reducing risk and protecting the planning area's investments. Below is the process for maintaining the plan reflecting change. The purpose is threefold:

1. To track progress on implementing the mitigation strategy
2. To update the plan as new information becomes available
3. To record when disasters occur

The plan needs to be revisited at regular intervals to keep it relevant. FEMA regulations require this to be done every five years. It should also be done after major disaster events or if new conditions significantly change risk.

Monitoring, Evaluating and Updating the Montgomery County Hazard Mitigation Plan is required by FEMA every five years. A review of the Montgomery County Hazard Mitigation Plan is required yearly. The planning team developed a method to ensure monitoring, evaluation, and updating of the Montgomery County Hazard Mitigation Plan occurs annually or as needed. The plan will be submitted to FEMA within five years for review. The County will form a Hazard Mitigation Plan Evaluation Sub-Committee of the existing Montgomery County Local Emergency Planning Committee (LEPC). The LEPC consists of members from fire service, health officials, emergency management, law enforcement, community groups, transportation, hospital personnel, school administration, emergency medical personnel, elected officials, and owners/operators of covered facilities. The Director of the Montgomery County Office of Emergency Management will be the initial Chair of the sub-committee or Planning Team Leader. The Planning Team Leader will contact the planning team committee, set up meeting dates quarterly, and ensure each community will maintain a representative on the team.

During the update period, representatives of the Planning Team will verify point of contact information is still correct. Also, as events occur within the jurisdictions covered by this plan, they will be recorded in the appropriate sections throughout. If the planning team feels a new hazard is faced by the County and its jurisdictions, then this hazard should be added and addressed in the plan. When Montgomery County receives a new Presidential Declaration, this will be noted in the appropriate sections of the plan. As Mitigation Actions are completed, the appropriate section of the plan will be updated. The responsible party for overseeing and assuring plan updates is the Montgomery County Office of Emergency Management. At this time, the maintenance procedures for the Mitigation Plan will be conducted at the quarterly LEPC meeting. Each community's representative will be responsible for monitoring and evaluating the progress of the mitigation strategies in the plan. The team members will monitor the plan by providing a mitigation planning update at each quarterly meeting. During the last LEPC meeting of each year, the sub-committee will meet to review and evaluate each goal and objective to determine their relevance to changing situations in Montgomery County. Changes in State or Federal policy will be evaluated. The Sub-committee will also review and evaluate the risk assessment portion of the plan to determine if this information should be updated or modified. The parties or agencies responsible for the various implementation actions will report on the status of their projects and will evaluate which implementation processes worked well, any difficulties encountered, how coordination efforts are proceeding, and which strategies should be revised.

The Montgomery County Office of Emergency Management will update the plan within three months before submitting it to the Sub-Committee members and the State Hazard Mitigation

Officer. If no changes are necessary, the State Hazard Mitigation Officer will be given a justification for this determination. Comments and recommendations offered by Sub-Committee members and the State Hazard Mitigation Officer will be incorporated into the plan update. In addition, the Montgomery County Hazard Mitigation Plan will be integrated into other plans. Integrating hazard mitigation into the local comprehensive plan establishes resilience as an overarching value of the community and provides opportunity to continuously manage development in a way that does not increase hazard vulnerability.

Land Use and Development Plans will guide future growth and development away from areas with known hazards. Plans will ensure design standards for new or improved construction taking potential hazards into account. Land use policies can build community resilience by taking information on location, frequency, and severity of hazards into consideration and setting forth recommendations that influence development in a way that does not increase risk to life and property.

Transportation Plans can build community resilience by adopting policies directing growth away from known hazard areas. Transportation systems and other critical infrastructure are designed to withstand the effect of known hazards, so they still function in the event of an emergency or disaster.

Housing Plans help strengthen community resilience by ensuring new or improved housing complies with existing building codes. They are a tool for identifying when building code improvements are needed. Opportunities to strengthen or replace structures identified as vulnerable to hazards can be promoted using existing maintenance or rehabilitation programs, or policies regarding non-conforming, substantially damaged, or improved properties.

Economic Development Plans can promote commercial or industrial expansion in areas that are not vulnerable to damage or disruption from hazards. They make community resilience a key feature in attracting, expanding, and retaining businesses and industry. Public Facilities and Infrastructure Plans can be adopted to ensure critical facilities (police and fire stations) and key infrastructure (water and wastewater treatment plants) are protected from the effects of hazards. They provide establish goals and policies for mitigation projects such as storm water drainage improvements or the public acquisition of hazard areas for open space.

Natural Resource Protection Plans have policies designed to preserve or enhance environmental areas of concern, such as wetlands, riparian corridors, and floodplains. They often include the added benefit of avoiding or minimizing development in hazard areas. These types of policies build community resilience by protecting lives and property and maintaining natural and beneficial functions of system acting as buffers against hazardous events.

Historic Properties and Cultural Resources Plans are designed to protect and preserve historic and cultural sites, buildings, and other resources. They can be linked with mitigation strategies to prevent damage and losses from hazardous events.

The Hazard Mitigation Plan will account for any changes in these plans and incorporate the information accordingly in its next update.

The Planning Committee will make every attempt to ensure the public will be able to directly comment on and provide feedback about the Plan. This will be done by posting the agenda and submitting meeting notice to the local media through newspaper articles, county websites and postings in public locations. This process will inform the citizens of the planning area on any changes or revisions of the Montgomery County Hazard Mitigation Plan.

Since future plans and government regulations may need to be adopted into the Hazard Mitigation Plan, Montgomery County Quorum Court will be informed of any necessary changes to the plan by the Team Leader, to be adopted into the Plan by county resolution. The Arkansas Department of Emergency Management will be contacted as necessary for professional and technical advice as needed.

2.5 Continuous Public Involvement

Montgomery County is dedicated to involving the public directly in the continual reshaping and updating of the Montgomery County Hazard Mitigation Plan. The Hazard Mitigation Plan Evaluation Sub-Committee members are responsible for the annual monitoring, evaluation, and update of the plan. Although they represent the public to some extent, the public will be able to directly comment on and provide feedback about the plan.

Copies of the FEMA approved Montgomery County Hazard Mitigation Plan will be available at www.wcapdd.org. Contained in the plan are the address, phone number, and e-mail of the Director of the Montgomery County Office of Emergency Management, the primary point of contact for the plan.

A public announcement inviting all interested parties will be made prior to each quarterly LEPC meeting, including the December LEPC meeting during which the Hazard Mitigation Planning Sub-Committee reviews and evaluates the plan in its entirety. This meeting will provide the public a forum for which the general public can express concerns, opinions, or ideas about the plan. The Montgomery County Office of Emergency Management and the Montgomery County LEPC will publicize and host this meeting. Following the meeting, the evaluation committee will review the comments and make changes to the plan, as appropriate.

2.6 Incorporation into Existing Planning Mechanisms

Montgomery County and all plan participants currently use state laws pertaining to compliance with the National Flood Insurance Program and state fire codes, to keep compliance with its hazard mitigation programs. These existing mechanisms have hazard mitigation strategies integrated into them. Montgomery County has a current Emergency Operations Plan. The Hazard Mitigation Plan will become an annex of the EOP for future submissions.

The Montgomery County Hazard Mitigation Plan will be available for public view on the West Central Arkansas Planning and Development District's website www.wcapdd.org and the Counties website for any entity or citizen who wishes to view or make a copy of it. Copies will also be made available at public libraries, the Montgomery County Courthouse, municipalities within the County including the Cities of Black Springs, Norman, Mount Ida, and Oden as well as the School Districts of Caddo Hills, Mounty Ida, and Oden (Ouachita River Campus).

Any participant without previous plans in place will be encouraged to develop zoning plans and other land ordinances to incorporate mitigation strategies. Participants will incorporate the Montgomery County Hazard Mitigation Plan as it pertains to them. After these discussions, each incorporating mechanism will follow their local laws or guidelines necessary for implementation through open forum public meetings. Each incorporating party will monitor the progress of any incorporated mitigation strategy and report the success or failure to the Emergency Operations Council for inclusion in its annual report. After each update of the Montgomery County Hazard Mitigation Plan, each incorporating participant will be informed of the changes so they can reflect these changes in their plans also.

All participating jurisdictions will use the risk assessment that was conducted in this mitigation plan for creating strategies when dealing with hazards. The data and maps will be used as

supporting documentation to encourage participating jurisdictions to address hazards affecting the planning area and organizations. This supporting data may be used in grant applications.

Montgomery County will incorporate the Montgomery County Hazard Mitigation Plan into the Montgomery County Continuity of Operations Plan and in county land use ordinances and/or plans by following the laws set forth by the county government.

Incorporating the plan into other plans will be done by vote at the regular quorum court meetings and passed by resolution.

All participating schools will incorporate the Montgomery County Hazard Mitigation Plan into their Continuity of Operations Plan by following the rules set forth by each school board. Incorporating the plan into continuity of operation plans will be done at regular school board meetings.

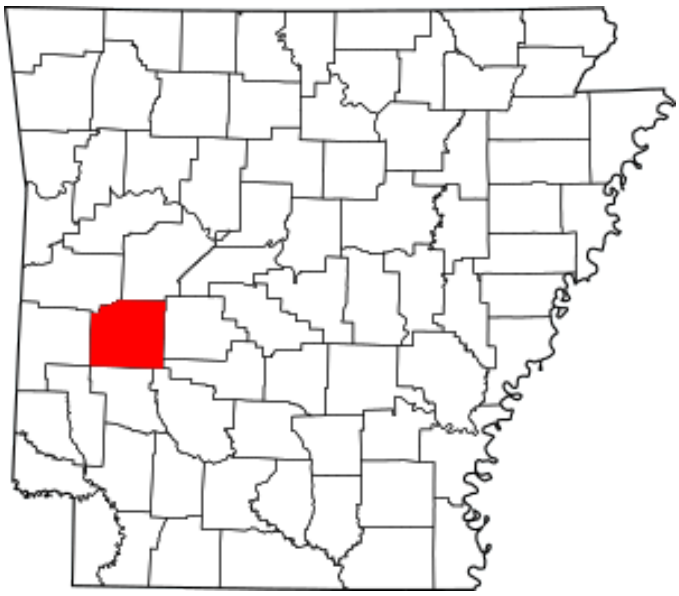
The previous plan was incorporated into the listed planning mechanisms to request grant funding for:

- Martin Simpson CR/Big Hill Creek Bridge
- Liberty Road Bridge Mitigation Project
- Sims Loop/ Rain Creek Bridge Mitigation Project
- Smith Creek Bridge at Liberty Church Mitigation Project
- Caney Creek Bridge Mitigation Project
- Hole in the Ground Bridge Project

SECTION 3 PLANNING AREA AND RESOURCES

3.1 General Geography

34°32’08”N 93°39’52”W



Situated in the Ouachita Mountains of west-central Arkansas is Montgomery County that consists 805 square miles with fewer than 10 people for each of those miles.

The Northern third of Montgomery County is located in the Fourche Mountains. The bottom two-thirds are located in the Central Ouachita Mountains. The Central Ouachita’s are very closely folded. Elevations of 2,000 ft. are common toward the center and the west and local relief is between 300 and 900 ft.

Mississippian rocks surface most of the Fourche Mountains and the Fourche Mountains and the Athens Plateau of the Ouachita. The Jackford sandstone is particularly important in the major mountain ridges. The Stanley shale is the most widespread formation.

The Central Ouachita’s are closely folded ridges and valleys of Ordovician and Silurian sandstone and shale. Two prominent formations are the Crystal Mountain sandstone which is overlain by the Mazarn shale.

Arkansas novaculite is exposed along the outer edge of the Central Ouachitas’, sometimes referred to as the Novaculite Uplift. The Novaculite is Devonian in age and is situated below the Hot Springs sandstone. It is very hard, fine grained rock of silica, used as an abrasive stone and as a silica source in manufacturing.

The Federal Government owns 70% of Montgomery County, only 30% of the county is privately owned.

Montgomery County is home to the Ouachita River, Ouachita Lake, Little Missouri River, and the Caddo River.

Lake Ouachita is a 49,000 acre lake located in Montgomery and Garland County. Created in the 1950's, it is one of the largest lakes in the United States. The Corps of Engineers created the lake as a flood control measure. The land along the shore of the lake belongs either to the Corps of Engineers or is part of the Ouachita National Forest.

The main source of water for the lake is Ouachita River. The bridge on Highway 27 marks the end of the Ouachita River and the beginning of Lake Ouachita. Along the Ouachita River, Montgomery County has two other rivers, the Little Missouri River, located in the Albert Pike Campground and the Caddo River, located near the cities of Norman and Caddo Gap.

For the purposes of the Montgomery County Hazard Mitigation Plan the planning area will consist all incorporated and unincorporated Montgomery County including the cities and municipalities of; Black Springs, Mount Ida, Norman, Oden. It also includes the School Districts; Caddo Hills, Mount Ida, and Oden (Ouachita River Campus).

General Land Use/Analyzing Development Trends

According to the United States Census Bureau Montgomery County has an estimated population of 8,620 in 2023 with a growth rate of -1.21% in the past year. Montgomery County has an area of 780.5 square miles with a population density of 10.9 people per square mile.

There are approximately 5,482 housing units in Montgomery County for the year 2022 with only 80.4% of them occupied.

The 2017 Census of Agriculture reports 428 farms spanning a total of 77,302 acres. The average size farm is 181 acres. This report shows a decline in the number of farms by -5% since the 2012 Census used in the 2017 Montgomery County Hazard Mitigation Plan.

The graphic below shows the breakdown of land use for agriculture in Montgomery County.

cp05097.pdf (usda.gov)

The majority of land use is comprised of 49% of pastureland followed by approximately 29% land use of cropland. Woodland constitutes for 19% of land use. Other uses, such as real estate for small businesses, accounts for the remaining 4% of land use.

There have been positive changes in the area due to the mitigation actions. Over the last five years the Planning Area has been awarded six mitigation grants for mitigation/bridge projects.

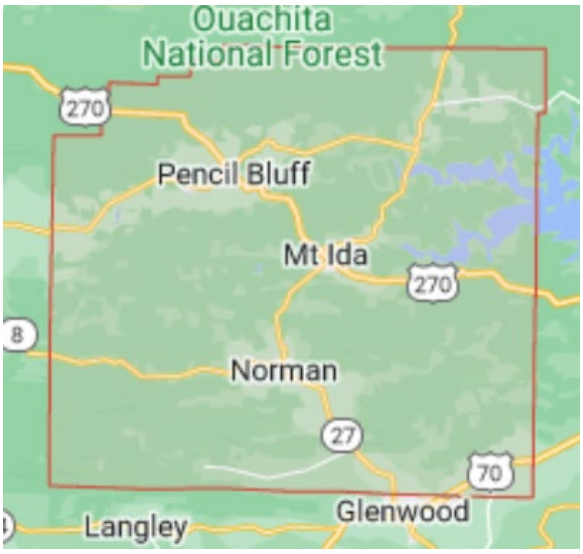
- March 7, 2018: Martin Simpson CR/Big Hill Creek Bridge
- August 10, 2018: Liberty Road Bridge Mitigation Project
- August 8, 2019: Sims Loop/ Rain Creek Bridge Mitigation Project
- September 11, 2020: Smith Creek Bridge at Liberty Church Mitigation Project
- August 11, 2021: Caney Creek Bridge Mitigation Project
- July 27, 2022: Hole in the Ground Bridge Project

The planning area has not seen a substantial increase or decrease in population, land use and development that would impact the community's infrastructure, people, and economy. However, this information will continue to be documented by the planning team over the next five years.

3.2 NFIP Participation

The National Flood Insurance Program (NFIP) enables property owners to purchase flood insurance. To qualify, communities must agree to adopt and implement local floodplain management regulations. These regulations are intended to protect lives and reduce the risk of new construction or substantial improvements from flooding. For more information please go to fema.gov/cis/AR.html.

Montgomery County ID 050453



Storm Water Management	No	Erosion Management	No
Stream Management	No	Floodplain Management	Yes
Zoning Management	No	Building Codes	No
Subdivision Management	No	Land Use Plan	No
Elevation Certificates	Yes	Flood Insurance Claims	No
Electric Provider	Entergy Corporation and Rich Mountain CO-OP Incorporated		
Telephone Services	Windstream Arkansas LLC.		
Natural Gas Provider	Center Point Entergy		
Water/Wastewater Treatment	No services are provided at the county level		

Montgomery County is a member of the National Flood Insurance Program. Their community Identification number is 050453. Their initial Flood Hazard Boundary Map (FHBM) was identified 07/16/87, their current effective map date 07/16/87 and Reg-Emergency Date 07/16/87.

Montgomery County participates in the NFIP by assisting residents with filling out documents for the NFIP and educating citizens about the NFIP program. Building permits are not issued by Montgomery County. However, Montgomery County does not have a Certified Floodplain Manager (CFM) who oversees the Counties floodplain management. David Kimball is designated at the Flood Plain Manager as he is the current OEM for Perry County. The CFM monitors land use. This includes new construction, substantial alterations to a structure, and changes in the use of a structure or land. If floodplain resources are needed that the County cannot provide, the Counties CFM requests assistance from Arkansas Natural Resource Conservation Service and FEMA. The ANRC provides technical assistance to the community assuring that the community is adequately enforcing its floodplain management regulations.

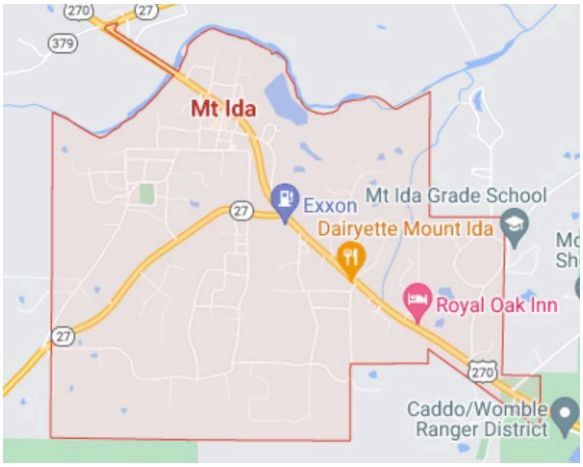
The county plans to continue participating in the NFIP through continuing floodplain education and continually evaluating structures:

- In need of improvements
- Substantially damaged
- Located within the floodplain

The County will work with owners who have structures that are substantially damaged or need improvements/repairs. The County will work with the owner to bring the structure into compliance with State and Federal NFIP compliance codes by providing the owner with the necessary codes and monitoring to ensure compliance

Montgomery County does not have a Community Rating System (CRS) Classification. Montgomery County currently lacks the necessary resources to take part in the CRS.

Mount Ida ID# 050353



Storm Water Management	No	Erosion Management	No
Stream Management	No	Floodplain Management	Yes
Zoning Management	No	Building Codes	No
Subdivision Management	No	Land Use Plan	No
Elevation Certificates	Yes	Flood Insurance Claims	No
Electric Provider	Entergy Corporation		
Water Provider	City of Mount Ida		
Wastewater Treatment	City of Mount Ida		
Natural Gas Provider	Center Point Entergy		
Telephone Services	Windstream Arkansas LLC.		

The City of Mount Ida is a member of the National Flood Insurance Program, Community Identification Number 050353. Their initial Flood Hazard Boundary Map was identified 04/11/75, the Initial Flood Insurance Rate Map identified 06/01/87, current effective map date 06/01/87, and Reg-Emergency Date 06/01/87.

The City of Mount Ida participates in the NFIP by assisting the residents with filling out documents for the NFIP and educating citizens about the NFIP program.

The Mayor of Mount Ida is the designated Floodplain Manager. The Floodplain Manager oversees the city's floodplain management program. The Floodplain Manager monitors land use within the city. This includes new construction, substantial alterations to a structure, and changes in the use of a structure or land. If floodplain resources are needed that the city of Mount Ida cannot provide, the Floodplain Manager requests assistance from County. If the County cannot provide the needed assistance they will rely on State/Federal guidelines and resources such as Arkansas Natural Resource Conservation Service (AMRC) and FEMA. ANRC provides technical assistance to the community assuring that the community is adequately enforcing its floodplain management regulations. The city plans to continue to participate through continuing floodplain education and staying in compliance with NFIP.

The City of Mount Ida and Montgomery County continues to evaluate structures that are:

- In need of improvements
- Substantially damaged
- Located within the floodplain

The city will work with owners who have structures that are substantially damaged or need improvements/repairs. The city will work with the owner to bring the structure into compliance with State and Federal NFIP compliance codes by providing the owner with the necessary codes and monitoring to ensure compliance.

The city of Mount Ida does not have a Community Rating System (CRS) Classification. At this time the city lacks the necessary resources to take part in the CRS.

Norman ID# 050158

Storm Water Management	No	Erosion Management	No
Stream Management	No	Floodplain Management	Yes
Zoning Management	No	Building Codes	No
Subdivision Management	No	Land Use Plan	No
Elevation Certificates	No	Flood Insurance Claims	No
Electric Provider	Entergy Corporation and Rich Mountain CO-OP Incorporated		
Water Provider	City of Norman		
Wastewater Treatment	No services are provided in the city of Norman		
Natural Gas Provider	No services are provided in the city of Norman		
Telephone Services	Windstream Arkansas LLC.		

The City of Norman is a member of the National Flood Insurance Program, Community Identification Number 050158. Their initial Flood Hazard Boundary Map was identified 10/17/1975, the Initial Flood Insurance Rate Map identified 08/23/1974, current effective map date 07/01/1987, and Reg-Emergency Date 07/01/1987.

The City of Norman participates in the NFIP by assisting the residents with filling out documents for the NFIP, issuing permits, and educating citizens about the NFIP program.

The city of Norman has a Certified Floodplain Manager. The Floodplain Manager oversees the city's floodplain management program. The Floodplain Manager monitors land use within the city. This includes new construction, substantial alterations to a structure, and changes in the use of a structure or land. If floodplain resources are needed that the city of Norman cannot provide, the

Floodplain Manager requests assistance from County. If the County cannot provide the needed assistance they will rely on State/Federal guidelines and resources such as Arkansas Natural Resource Conservation Service (AMRC) and FEMA. ANRC provides technical assistance to the community assuring that the community is adequately enforcing its floodplain management regulations.

The city plans to continue to participate through continuing floodplain education, overseeing, issuing permits, and staying in compliance with NFIP.

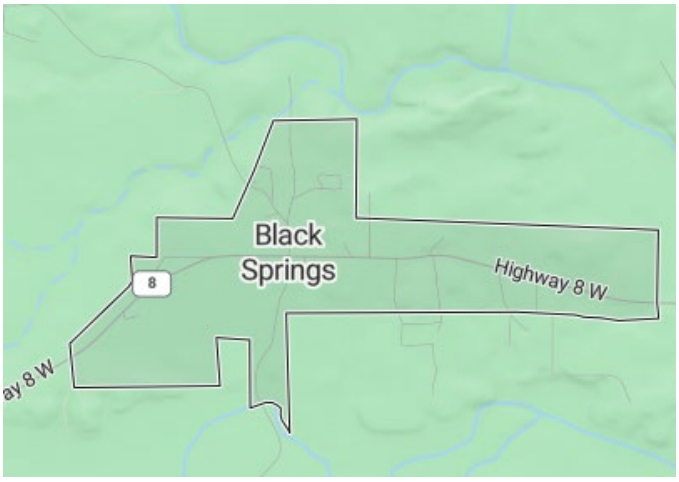
The City of Norman and Montgomery County continues to evaluate structures that are:

- In need of improvements
- Substantially damaged
- Located within the floodplain

The County will work with owners who have structures that are substantially damaged or need improvements/repairs. The County will work with the owner to bring the structure into compliance with State and Federal NFIP compliance codes by providing the owner with the necessary codes, permits and monitoring to ensure compliance.

The city of Norman does not have a Community Rating System (CRS) Classification. At this time the city lacks the necessary resources to take part in the CRS.

The city of Black Springs does not participate in the NFIP. At this time the city of Black Springs does not have any plans to participate in the NFIP.



Storm Water Management	No	Erosion Management	No
Stream Management	No	Floodplain Management	No
Zoning Management	No	Building Codes	No
Subdivision Management	No	Land Use Plan	No
Elevation Certificates	No	Flood Insurance Claims	No
Electric Provider	Entergy Corporation and Rich Mountain CO-OP Incorporated		
Water Provider	Private Wells		
Wastewater Treatment	No services are provided from the city of Black Springs		
Natural Gas Provider	No services are provided from the city of Black Springs		
Telephone Services	Windstream Arkansas LLC.		

The city of Oden does not participate in the NFIP. In the previous Hazard Mitigation Plan they provided a narrative stating they planned to participate. However, there has been no action at this time.

Storm Water Management	No	Erosion Management	No
Stream Management	No	Floodplain Management	No
Zoning Management	No	Building Codes	No
Subdivision Management	No	Land Use Plan	No
Elevation Certificates	No	Flood Insurance Claims	No
Electric Provider	Entergy Corporation and Rich Mountain CO-OP Incorporated		
Water Provider	City of Oden		
Wastewater Treatment	No services are provided in the City of Oden.		
Natural Gas Provider	No services are provided in the city of Oden		
Telephone Services	Windstream Arkansas LLC.		

School Districts: There are three school districts located in the Planning Area.

Caddo Hills School District is located on the school campus at 2268 Hwy 8 East, Norman, AR.

Mount Ida School District has 2 schools located in Mount Ida.

- Elementary School located at 430 Ball Park Rd.
- High School located at 338 Whittington St.

Oden School District (Ouachita River Campus) is located at 135 School Dr. Oden AR 71961.

National Flood Insurance Program (NFIP) School Districts are not required to be a member of the NFIP.

3.3 CAPABILITY ASSESSMENT

Jurisdiction	Planning and Regulatory Capabilities														
	Comprehensive Mater Plan	Capital Improvements	Economic Development Plan	Local Emergency Operations Plan	Continuity of Operations Plan	Transportation Plan	Stormwater Management Plan	Community Wildfire	Fire Department ISO Rating	Zoning Ordinance	Subdivision Ordinance	Floodplain Ordinance	Building Codes	Acquisition of land for Open space	BCEGS Score
Montgomery County			X	X	X			X				X			
Black Springs															
Mt. Ida		X	X	X	X		X	X				X			
Norman															
Oden	X	X	X					X		X					
Caddo Hills School District				X	X										
Mt. Ida School District				X	X	X							X		
Oden (Ouachita River Campus)	X	X		X		X				X			X	X	

Jurisdiction	Financial Capabilities						
	Fees for water, sewer, gas, or electric services	Capital improvements project funding	Community Development Block Grant	Federal Funding Programs	State Funding Programs	Impact fees for new development	Authority to levy taxes for specific purposes
Montgomery County		X	X	X	X		
Black Springs							
Mt. Ida	X	X	X	X	X		X
Norman	X		X	X			X
Oden	X			X			X
Caddo Hills School District							
Mt. Ida School District							
Oden School District (Ouachita River Campus)							

Jurisdiction	Education and Outreach Capabilities					
	Non-Profit Organizations for environmental protection, emergency preparedness, or access to assist functional needs populations	Ongoing Public Education Program or information program	Natural Disaster or safety related school programs	Firewise Communities Certification	Public-private partnership initiatives addressing disaster related issues	Storm Ready Certification
Montgomery County	X	X		X	X	X
Black Springs				X		
Mt. Ida	X		X	X	X	X
Norman				X		
Oden						
Caddo Hills School District						
Mt. Ida School District						
Oden School District (Ouachita River Campus)						

Jurisdiction	Administrative and Technical Capabilities										
	Montgomery County Local Emergency Planning Committee	Planning Commission	Mutual Aid Agreements	Maintenance Programs to Reduce Risk	Floodplain Administrator	Emergency Manager	Community Planner / Grant Writers	GIS / HAZUS	Warning Systems	Civil Engineer	Hazard Data and Information
Montgomery County	X				X	X	X		X		
Black Springs											
Mt. Ida			X	X	X		X		X		
Norman			X				X			X	
Oden	X		X	X							
Caddo Hills School District			X						X		
Mt. Ida School District											
Oden School District (Ouachita River Campus)			X	X		X			X		X

3.4 Improving Capabilities

Leadership and representatives in all participating jurisdictions are very receptive to mitigation. The Montgomery County Judge, Montgomery County OEM, and leadership make mitigation a top priority. Representatives are actively seeking additional funding to improve the readiness and preparedness of their communities. Ways the communities are improving capabilities are:

- Expand upon education and outreach about mitigation activities with an emphasis on underserved populations.
- Work with schools and local jurisdictions to construct saferooms.
- Exploring funding options for flood mitigation.
- Improving roadways and bridges against flooding
- Constructing a County/Community Wildfire Plan

SECTION 4 HAZARD IDENTIFICATION AND RISK ASSESSMENT

4.1 Risk Assessment Overview

This chapter focuses on how the hazards identified in the Planning Area directly and uniquely impact people, the economy, the built environment, and the natural environment.

The risk assessment helps communicate vulnerabilities, develop priorities, and inform decision-making for the hazard mitigation plan and for other emergency management efforts. This plan was completed with hours of input from stakeholders and community members in the Planning Area. The 2023 risk assessment provides the factual basis for developing a mitigation strategy for the Planning Area.

This assessment integrates an assets-based approach with an analysis of individual hazards to provide a deeper understanding of specific hazards and their impact on the Planning Area. An assets-based approach aligns with the most current FEMA guidance, allows communities to identify assets that are critical to their stability and that are most exposed to hazards. For hazard mitigation planning, this approach allows communities to drive mitigation actions more effectively. Beyond the scope of this mitigation plan, results from the risk assessment should be integrated into future emergency management planning, recovery planning, and development efforts.

4.2 Structure of the Risk Assessment

This introductory section includes a brief discussion of previous FEMA disaster declarations, an overview of the hazard assessment process, and a summary risk profile for the Planning Area. The risk profile is driven by an assessment of the hazard's overall significance, combined with a hazard's probability and extent, along with community vulnerabilities to the hazard. The individual risk assessment for each hazard aligns with the same format. They outline a hazard's overall significance from a determination of its specific probabilities, risks, and communities' specific vulnerabilities to them.

4.3 Developing the 2024 Risk Assessment

The 2023 risk assessment updates the risk assessment found in the 2017 Montgomery County Hazard Mitigation Plan. The update process included reviews of the 2017 Plan, previous events, and the specific vulnerabilities of the planning communities.

Outreach to subject-matter experts, stakeholders, the public and information from the National Risk Index ensured the appropriate elements of each hazard were included and that the best-available data was used for the risk assessment.

4.4 Hazard Risk Profile Overview

The hazard risk profile summarized each hazard's probability, location, extent, vulnerability, and overall significance. FEMA's Local Mitigation Planning Handbook Worksheet 5.1 provided the

basis for these classifications, but they were adjusted to better meet the needs of the Planning Area. An overview of these four classifications is provided below.

4.5 Vulnerability and Risk Assessment by Hazard

Vulnerability examines what assets are susceptible to damage from each hazard. Vulnerability is a qualitative estimate based on the Planning Teams desktop research and local expertise from the officials and stakeholders in the Planning Area.

The Planning Team did not use a quantitative metric to describe the vulnerability for each hazard since the vulnerability was not uniform across the Planning Area for all hazards. Instead, the Planning Team used a narrative to describe vulnerability.

The Montgomery County Hazard Mitigation Plan includes a description or profile, location, and extent of all-natural hazards affecting each jurisdiction. (44 CFR 201.6(c)(2)(i) and 44 CFR 201.6(c)(2)(iii).

Description: the natural hazard affecting the jurisdictions in the planning area.

Location: (Geographic Area Affected) the geographic areas in the planning area affected by the hazard, and when possible, maps to illustrate the location. But for some hazards, such as tornados, the plan states the entire planning area is equally at risk to that hazard.

Extent: (Magnitude/Strength based on historic events or future probability)

Previous Occurrences: hazard events for each jurisdiction (44 CFR 201.6 (c)(2)(i) that have been addressed.

Probability of Future Events: means the likelihood of the hazard occurring in the future and may be defined in terms of general descriptors, historical frequencies, and statistical probabilities. Statistical probabilities often refer to events of a specific size or strength. Hazard likelihood can also be compared using general descriptions or rankings. For the purpose of this plan, we will use the general descriptors to describe the likelihood of hazard events based on historical frequency.

The equation used to estimate probability of future events:

$$\frac{\#\text{ of events}}{\#\text{ of days}} \times 100 = \_\_\_\_\_$$

Impact: the consequence or effect of the hazard on the community and its assets. Impacts will be described by referencing historical disaster impacts and/or an estimate of potential future losses, such as percent damage of total exposure.

Vulnerability of Estimating Potential Loss: identifies structures, systems, populations, or other community assets as defined by the community susceptible to damage and loss from hazard events. It is a list of key issues or problem statements that clearly describe the community's greatest vulnerabilities and will be addressed in the mitigation strategy.

Repetitive Loss Properties and Severe Repetitive Loss Properties: addresses NFIP insured structures describing the types (residential, commercial, institutional, etc.) and estimates the number of repetitive loss properties located in the identified flood hazard areas. (44 CFR 201.6(c)(2)(ii)

Methodology used in Estimating Potential Loss

The methodology used in this plan for the potential loss estimate was developed by using past hazard events data from The National Climatic Data Center (NCDC) Storm Events Database.

If we were unable to obtain information of a certain type of past hazard event, we did not estimate a potential loss due to the lack of information.

Natural Hazards Affecting the Planning Area

This mitigation plan addresses the natural hazards affecting the planning area. The hazards of concern are dam failure, drought, earthquake, extreme heat, flooding, landslides, thunderstorms, tornadoes, wildfire, and winter storms. Expansive soils are not addressed in this plan since they are not an issue/threat to the planning area.

4.6 Disaster Declaration History

The Planning Area has been a recipient to 14 disaster declarations from 2000-2023. Since the adoption of the Montgomery County Hazard Mitigation Plan in 2017, there have been 4 disaster declarations in the Planning Area. The table below is a list of disaster declarations from 2000-2023. For more information on the data in the table below please go to Disaster Declarations for States and Counties | FEMA.gov.

Disaster Declaration	Date	Incident Description
3541	8/27/2020	Hurricane Laura
3461	4/3/2020	Covid-19 Pandemic
4318	6/15/2017	Covid-19 Pandemic
4254	2/5/2016	Severe Storms, Tornados, Straight line winds, Flooding
4226	6/26/2015	Severe Storms, Tornados, Straight line winds, Flooding
4124	6/25/2013	Severe Storms, Tornado, Flooding
1975	5/2/2011	Severe Storms, Tornado, Associated Flooding
3301	1/28/2009	Severe Winter Storm
1804	10/22/2008	Tropical Storm Ike
1793	9/18/2008	Severe Storm and Flooding associated with Hurricane Gustov
3215	9/2/2005	Hurricane Katrina Evacuation
1354	12/29/2000	Severe Winter Ice Storm
3159	12/28/2000	Severe Winter Ice Storm

4.7 Hazard Classification and Identification

Classification

The planning team considered a full range of hazards that could affect the area for the 2024 Montgomery County Hazard Mitigation Plan. FEMA and the Department of Homeland Security generally organize threats and hazards into three categories:

- Natural
- Technological/accidental (dam incident)
- Human-induced/intentional

This plan will address hazards that can be categorized as natural or technological/accidental. Although this plan recognizes the potential threat caused by human-induced/intentional threats, these considerations are outside the scope of this mitigation plan. Natural or technological hazards that have posed a historical threat or a probable future threat were addressed because they FMEA's hazard mitigation requirements. These assessed hazards were derived from the State Hazard Mitigation Plan and from the 2016 Montgomery County Hazard Mitigation Plan. The planning team, stakeholders, and the public participated in meetings and hazard questionnaires that were designed to discuss each hazard as it relates to the Planning Area.

Identification

Hazard identification is the process of identifying hazards threatening a given area. It is the first step in the risk assessment process. The planning team identified several natural hazards posing a threat to the Planning Area warranting a complete profile in this hazard mitigation plan.

The following hazards were identified from historical information provided by planning team members, newspapers, review of plans, reports, internet research, the State Mitigation Plan, FEMA publication "Multi-Hazard Identification and Risk Assessment", and information provided by FEMA and ADEM.

Hazards	Hazard Events
Dam/Levee Failure	There have been no dam/levee failures in Montgomery County
Drought	20 events reported from 2000-2024
Earthquake	1 event reported from 2000-2022 that registered 2.2 on the Richter scale
Extreme Heat	There have been no extreme heat events reported from 2000-2024
Expansive Soils	There were no occurrences. Will not be addressed in this plan. Does not pose a threat to life or property in Montgomery County.
Flood / Flash Floods	51 Flood events/ 28 Flash Flood events from 2000-2024
Hailstorm	99 events from 2000-2024
Landslide	1 event (2010) from 2000-2023
Lightning	3 events from 2000-2024
Strong Winds	7 events from 2000-2024
Thunderstorm Wind	125 events reported from 2000-2024
Tornado	11 events from 2000-2024
Wildfire	8 events reported from 2000-2024
Winter Storm / Ice Storm	17 Winter Weather events, 6 Ice storm events from 2000-2024

Storm Events Database - Search Results | National Centers for Environmental Information (noaa.gov)

4.8 Natural Hazards Affecting Montgomery County

This mitigation plan addresses the natural hazards affecting the planning area. The hazards of concern are dam failure, drought, extreme heat, earthquake, flooding, landslides, thunderstorms, tornadoes, wildfire, and winter storms. Expansive soils are not addressed in this plan since they are not an issue/threat to the planning area.

4.8.1 Dam

Dam failure: A dam failure is the collapse, breach or other failure resulting in downstream flooding. A dam impounds water in the upstream area, referred to the reservoir. The amount of water impounded is measured in acre-feet. An acre-foot is the volume of water that covers an acre of land to a depth of one foot. As a function of upstream topography, even a very small dam may impound or detain many acre-feet of water. Two factors influence the potential severity of a full or partial dam failure:

1. Amount of water impounded
2. Density, type, and value of development and infrastructure located downstream

The Arkansas Natural Resource Commission (ANRC) provides comprehensive regulation and supervision of dams. The link may be used to reference the ANRC Rules Governing Design and Operation of Dams Title 7. TITLE VII (arkansas.gov)

Low Risk Dams that are private, county, or state-owned dams not presenting a danger to individuals, structures, residential housing, county roads or state highways will not be addressed in this plan.

Extent, Magnitude or Severity of Dam Failure: Currently, no studies are available for the dams to determine the extent of dam failure in the Planning Area. The need to conduct flood inundation studies for high and significant risk hazard dams will be addressed in this plan as a mitigation action.

Possible Impact of Climate Change: The challenges posed by climate change, such as more intense storms, frequent heavy precipitation, heat waves, drought, and extreme flooding would have minimal impact on dam failure but will be noted for continued research on nature-based solutions to mitigate all possibilities of potential increased impact.

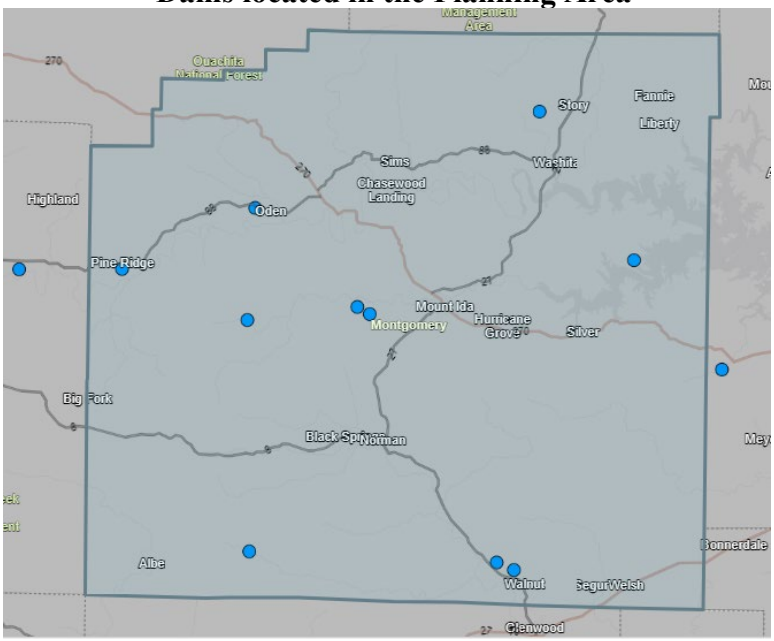
Possible Impact of Population Change: Changes in population pose a threat to dams and dam failure. Population growth and urbanization change the landscape of the area. This results in loss/addition of natural landscaping such as trees, grass, and rock. Building structure influence climate and the natural path of water flow. Population growth will have an impact on the number of resources used. Adjustments for population growth impacts wildlife. Population growth increases the chances of loss of life if dam failure were to occur.

Previous Occurrences: There have been no previous occurrences of dam failure in the Planning Area. However, there is always a possibility that a dam failure could occur. There is less than 1 percent chance that a dam failure will occur in any given year.

Each dam will be described separately with their corresponding location, impact, and overall summary of vulnerability due to the uniqueness of each dam and location.

Low Risk Dams that are private, county or state owned dams not presenting a danger to individuals, structures, residential housing, county roads or state highways will not be addressed in this plan.

Dams located in the Planning Area

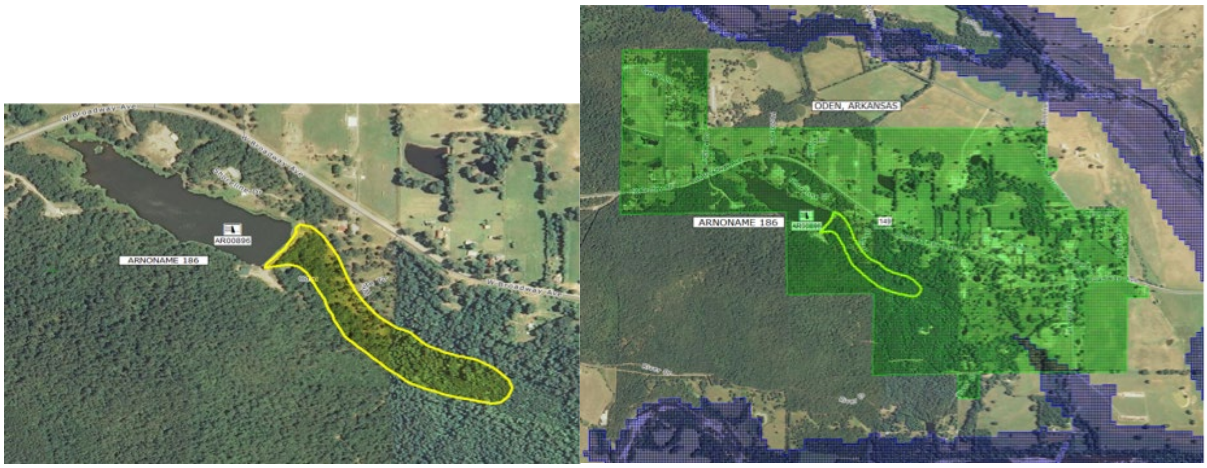


National Inventory of Dams (army.mil)

Dam	Category	ANRC Hazard Classification	EAP	Data Deficiency	Probability of Future Events
Mt Ida Water Supply Dam		High	Yes	Yes	Unlikely
Arnoname 186 Ozark Interests	1	High	NR	Yes	Unlikely
North Fork of S Fork Site 3		Significant	NR	Yes	Unlikely
Sanderson Dam		Significant	NR	Yes	Unlikely
Tigue Lake Dam		Significant	NR	Yes	Unlikely
Hatfield Lake Dam		Significant	NR	Yes	Unlikely
Ouachita Nursery Pond		Low	NR	Yes	Unlikely
Milchem Lake Dam		Low	NR	Yes	Unlikely
Owens Lake Dam		Low	NR	Yes	Unlikely
Story Pond		Low	NR	Yes	Unlikely

National Inventory of Dams (army.mil)

ARNONAME Dam: Lat: 34.62166 Long: -93.79 NPDP ID: AR00896 'High' Hazard Risk



ARNONAME 186 is a private lake dam owned by Ozark Interest Inc., CW Maddox. The dam was constructed in 1962 and is used for recreation purposes; the dam height is16 feet high and 367 feet long and is of Earth construction. It has a normal surface area of 16 acres, elevation is 794 ft above MSL or 242 meters. The maximum discharge capacity is 1,815 cubic feet per second. Its maximum capacity is 210 acre feet. Normal storage is 154 acre-feet. The drain area is 0.62 square miles.

Impact and Vulnerability

In the event of dam failure, the inundation area outlined in yellow on the map above is an estimate of the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property. A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment.

Arnoname 186 Dam sits inside the Oden city limits, however, there is no expected threat to residential structures, businesses, critical facilities, or people. Loss of life is not expected.

Extent, Magnitude, or Severity of Dam Failure

This dam does not have an EAP. It is not required. There have not been any inundation studies documented to determine the extent of dam failure. According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure as needed.

HATFIELD LAKE DAM: Lat: 34.57889 Long: -93.90361 NPDP ID : AR00898 'Significant' Risk Hazard.

Hatfield Lake Dam is a private lake owned by O. W. Hatfield. The dam was constructed in 1960 and is used for irrigation, water supply, and recreation purposes, has a dam height of 17 feet and is 366 feet long and is an earthen dam. It has a normal surface area is not provided on the National Inventory of Dams site. Elevation is 798 ft above MSL or 243 meters and is of earthen construction. Maximum discharge is 1542 cubic feet per second. Its maximum capacity is 84 acre feet. Normal storage is 49 acre feet. There is no data for the square miles of drainage for this dam on the National Inventory of Dams.

Impact/Vulnerability

In the event of a dam failure the approximate inundation area is outlined in yellow to estimate the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property. A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment.

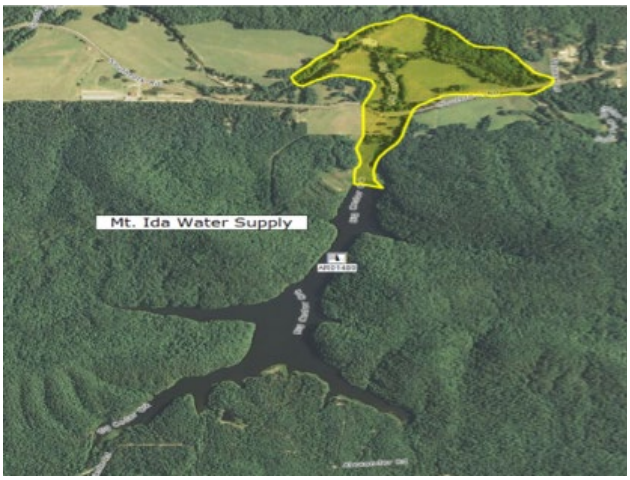
No structures or individuals are threatened by a failure of this dam. Oden, Arkansas is 7.2 miles downstream of this dam.

Extent, Magnitude, or Severity of Dam Failure

This dam does not have an EAP. It is not required. There have not been any inundation studies documented to determine the extent of dam failure. According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure as needed.

MT IDA WATER SUPPLY DAM (AKA SOUTH FORK WATERSHED SITE 01): Lat: 34.55222 Long: -93.70277, NPDP ID : AR01489 'High' Risk Hazard.



This dam is located in the unincorporated areas of Montgomery County. The area affected is negligible in that less than 10 percent of the planning area consists of isolated single-point occurrences.

Impact/Vulnerability

In the event of a dam failure the approximate inundation area is outlined in yellow to estimate the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property. A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment. The surface area is 85 acres, and the elevation is 729 foot above MSL or 222 meters. The maximum discharge of water is 2,973

cubic foot per second with a maximum capacity of 7,250 acre-feet. The normal storage is 1,590 acre-feet with a drainage area of 5.7 square miles.

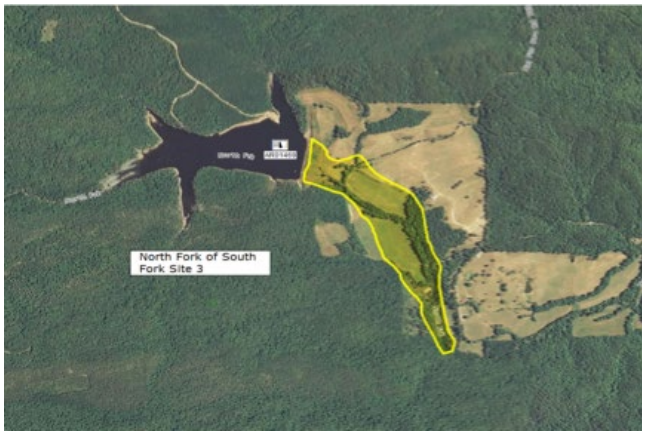
Extent, Magnitude, or Severity of Dam Failure

This dam does have an EAP. The date of the last EAP revision is not documented on the National Inventory of Dams.

There have not been any inundation studies documented to determine the extent of dam failure. According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure as needed.

NORTH FORK OF S. FORK SITE 3: Lat: 34.54305 Long: -93.79666, NPDP ID : AR01469 'Significant' Risk Hazard.



North Fork of S. Fork Site 3 is a local lake owned by Montgomery County Soil and Water Conservation District. The dam was constructed in 1986 and is used for flood risk reduction. It has a dam height of 65 feet and is 1580 feet long and is an earthen dam. It has a normal surface area of 66 acres, elevation is 845 ft above MSL or 258 meters and is of earthen construction. Maximum discharge is 9,853 cubic feet per second. Its maximum capacity is 4,625 acres per feet. Normal storage is 703 acres per feet. The drain area is 6.7 square miles.

Impact/Vulnerability: In the event of a dam failure the approximate inundation area is outlined in yellow to estimate the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property: A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment.

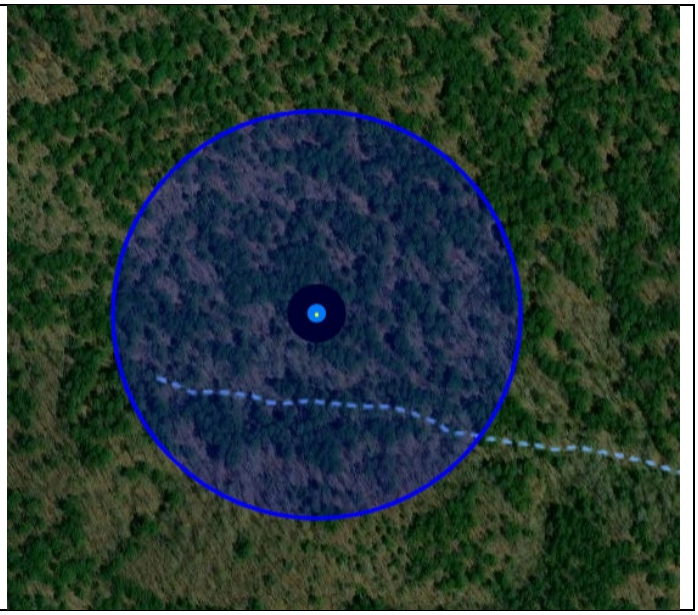
There are no structures or individuals threatened by failure of North Fork of S. Fork Site 3. Inundation would drain into the 100 Year Flood zone for Montgomery County. Mt. Ida, Arkansas is approximately 9 miles downstream.

Extent, Magnitude, or Severity of Dam Failure

This dam does not have an EAP. It is not required. There have not been any inundation studies documented to determine the extent of dam failure. According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure as needed.

SANDERSON DAM: Lat: 34.54722222 Long: -93.69222222, NPDP ID : AR00726 Significant Risk Hazard.



Sanderson Dam is owned by the local government. It is owned by the Hot Springs Municipal Waer system. The dam was constructed in 1925 and is used for water supply purposes, has a dam height of 49 feet and is 310 feet long and is a gravity dam. It has a normal surface area of 56 acres. Maximum discharge is 16,000 cubic feet per second. Its maximum capacity is 608 acres per feet. Normal storage is 517 acres per feet. The drain area is approximately 2.2 square miles.

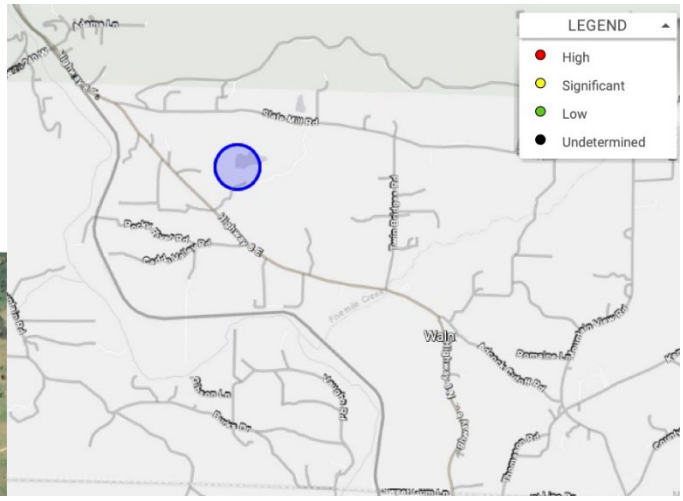
Impact/Vulnerability: In the event of a dam failure the approximate inundation area is outlined in yellow to estimate the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property. A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment. There are no structures or individuals threatened by failure of Sanderson Dam.

Extent, Magnitude, or Severity of Dam Failure

This dam does not have an EAP. There have not been any inundation studies documented to determine the extent of dam failure near Cleveland, an unincorporated area of Conway County. According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure.

TIGUE LAKE DAM: Lat: 34.37277 Long: -93.58388, NPDP ID : AR01162 'Significant' Risk Hazard.



Tigue Lake Dam is a private lake owned by Fred Tigue. The dam was constructed in 1978 and is used for recreation purposes, has a dam height of 25 feet and is 400 feet long and is an earthen dam. It has a normal surface area of 0 acres, elevation is 655 ft above MSL or 200 meters and is of earthen construction. Maximum discharge is 0 cubic feet per second. Its maximum capacity is 80 acre feet. Normal storage is 48 acre feet. The drain area is 0 acres.

Impact/Vulnerability

In the event of a dam failure the approximate inundation area is outlined in yellow to estimate the area impacted. Dam failure can range from spillover up to a catastrophic breach. Spillover could cause damage or destruction of property. A complete breach would threaten loss of life to people and animals, as well as destruction of property and the environment.

No individuals or structures are threatened by a potential dam failure.

Extent, Magnitude, or Severity of Dam Failure

This dam does not have an EAP. There have not been any inundation studies documented to determine the extent of dam failure near Cleveland, an unincorporated area of Conway County.

According to Association of Dam Safety Dams Incident Database there have been no breaches (https://damsafety.org/incidents).

Over the next five years the Planning Team should research and document natural based mitigation projects for dam failure.

4.8.2 Drought

A drought is a period of unusually dry weather that persists long enough to cause serious deficiencies in water supply (surface or underground). Drought conditions can mean different things in different regions. Normally a drought conditions are defined depending on the average amount of precipitation that an area is accustomed to receiving.

Determining the start of a drought can be tricky as there is no sudden and dramatic onset of this natural hazard unlike tornadoes, earthquakes, and hurricanes. Droughts are more of a slow onset hazard. It can take weeks or years for the full effects of long-term inadequate rainfall to become apparent. However, over time they can severely affect crops, municipal water supplies, recreation resources and wildlife. If drought conditions extend over a number of years, the direct and indirect economic, social, vegetative, wildlife and climate impacts can be significant. In addition, human actions and demands for water resources can accelerate drought-related impacts. There can be a cascading effect as high temperatures, high winds, and low humidity occurring in drought conditions may make areas more susceptible to wildfire.

The end of a drought is also difficult to determine. A single rainstorm will provide short term relief from a drought, but it may take weeks or months before levels of precipitation return to normal.

The United States Droughty Monitor (USDM) differentiates between short-term and long-term drought. Short-term drought can have impacts on agriculture and grasslands, and the drought classification can rapidly change. Long-term drought, in contrast, has deeper impacts on hydrology and ecology and can persist even with short-term gains in precipitation (Drought Classification | U.S. Drought Monitor (unl.edu)).

- S = Short-term, typically less than 6 months (agriculture, grasslands)
- L = Long-term, typically more than 6 months (hydrology, ecology)
- SL = Area contains both short- and long-term impacts

Locations Affected by Drought

The entire Planning Area is equally susceptible to experiencing a drought. There is no defined geographic hazard boundary.

Extent, Magnitude or Severity of Drought

The entire Planning Area could experience a drought that is rated between a D0 and D2 in any given year.

Drought Severity Classification								
RANGES								
Category	Description	Possible Impacts	Palmer Drought Index	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Percent of Normal Precipitation	Standardized Precipitation Index (SPI)	Satellite Vegetation Health Index
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-1.0 to -1.9	21-30	21-30	<75% for 3 months	-0.5 to -0.7	36-45
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing, or imminent, voluntary water use restrictions	-2.0 to -2.9	11-20	11-20	<70% for 3 months	-0.8 to -1.2	26-35
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed	-3.0 to -3.9	6-10	6-10	<65% for 6 months	-1.3 to -1.5	16-25
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions	-4.0 to -4.9	3-5	3-5	<60% for 6 months	-1.6 to -1.9	6-15
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells, creating water emergencies	-5.0 or less	0-2	0-2	<65% for 12 months	-2.0 or less	1-5

Drought Classifications (weather.gov)

Previous Occurrences

There have been 15 past occurrences of drought in the Planning area in the years of 2000-2023.

NOAA Storms Database for Drought

Number of County/Zone areas affected:	1
Number of Days with Event:	15
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	0
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	09/08/2000	18:00	CST	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	12/21/2010	06:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	01/01/2011	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	02/01/2011	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	03/01/2011	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	08/02/2011	06:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	06/19/2012	06:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	07/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	08/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	09/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	10/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	11/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	12/01/2012	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	01/01/2013	00:00	CST-6	Drought		0	0	0.00K	0.00K
CONWAY (ZONE)	CONWAY (ZONE)	AR	11/14/2017	00:00	CST-6	Drought		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Storm Events Database - Search Results | National Centers for Environmental Information (noaa.gov)

September 8, 2000, the Governor of Arkansas asked that all 75 counties in Arkansas be declared agricultural disasters areas. Dry foliage and dead grass led to numerous grass fires. 1200 acres burned in the Petit Jean State Park leaving several forested areas completely burned.

The Planning Area was stricken with drought conditions January to March and again in August of 2011.

In May of 2012 there was unusually dry weather in Arkansas. It was the driest May on record for the Planning Area and surrounding jurisdictions. As June approached the combination of sparse rainfall and rising temperatures led the drought event to be categorized as extreme. Water companies-initiated water conservation strategies. Pastures and stock ponds dried up forcing cattle grower to send their cattle to market. Crops failed. The entire State of Arkansas was placed under a burn ban. Daily wildfires broke out across the State, burning up to 100 acres each time. July 3, 2012, Governor Mike Beebe authorized the National Guard to use Black Hawk helicopters to assist firefighters by dropping water on the larger fires using 660-gallon Bambi Buckets. Drought conditions in the Planning Area continued to exist thru January of 2013.

In 2017, the months of September thru November were very dry. There had been a 50% decrease in normal rainfall and November 2017 is the driest November on record. Vegetation was dry and tributaries were low. The Planning Area entered D2 drought designation on November 14, 2017.

For mapping of past drought conditions, please go to Montgomery County Conditions | Drought.gov. Mapping goes back to 1979 and is updated every five days.

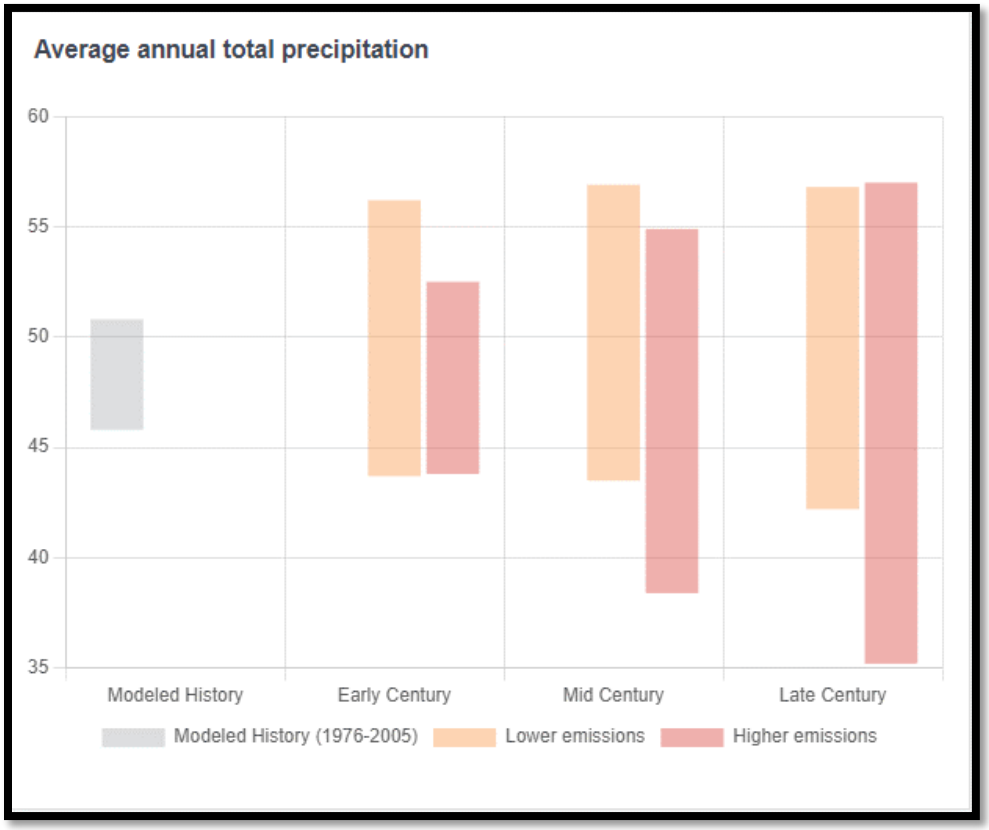
Probability of Future Events

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Average annual total precipitation	48" 46 - 51	49" 44 - 56	49" 44 - 52	49" 44 - 57	49" 38 - 55	49" 42 - 57	49" 35 - 57
Days per year with precipitation (wet days)	163 days 156 - 170	159 days 146 - 170	158 days 132 - 168	158 days 142 - 170	156 days 122 - 174	157 days 140 - 171	152 days 110 - 175
Days per year with no precipitation (dry days)	203 days 195 - 209	206 days 195 - 220	207 days 197 - 233	207 days 196 - 223	209 days 192 - 243	208 days 194 - 226	213 days 190 - 255
Maximum number of consecutive dry days	16 days 14 - 20	17 days 14 - 21	17 days 14 - 20	18 days 15 - 21	17 days 14 - 22	18 days 15 - 25	18 days 15 - 26
Temperature thresholds:							
Annual days with maximum temperature > 90 °F	63 days 63 - 75	92 days 74 - 113	95 days 73 - 116	103 days 75 - 127	111 days 88 - 130	114 days 87 - 144	142 days 112 - 168
Annual days with maximum temperature > 100 °F	7 days 6 - 9	19 days 5 - 37	21 days 7 - 54	27 days 6 - 57	35 days 15 - 84	36 days 12 - 57	68 days 30 - 117

N/A = Data Not Available for the selected area

Climate Projections for Early Century (2015–2044)	Lower emissions	Higher emissions
Average annual total precipitation	48.8 Inches + 0.5 since 1976-2005	49.0 Inches + 0.7 since 1976-2005
Days per year with precipitation (wet days)	159.0 Days - 3.6 since 1976-2005	158.1 Days - 4.5 since 1976-2005
Days per year with no precipitation (dry days)	206.2 Days + 3.6 since 1976-2005	207.1 Days + 4.5 since 1976-2005
Maximum number of consecutive dry days	17.1 Days + 0.8 since 1976-2005	17.2 Days + 0.8 since 1976-2005
Annual days with maximum temperature > 90°F	92.1 Days + 25.1 since 1976-2005	94.6 Days + 27.6 since 1976-2005
Annual days with maximum temperature > 100°F	18.7 Days + 11.8 since 1976-2005	21.0 Days + 14.0 since 1976-2005



CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)

Climate mapping trends indicate a slight increase in annual precipitation with a decrease in the number of wet days. This combined with an increase in the number of dry days, an increase in the number of consecutive dry days, and rising temperature thresholds could mean that future drought conditions could exist.

The probability that the Planning Area will experience a drought event every year is less than one percent.

The probability of a drought was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

Vulnerability and Impact of Drought

Lack of water could be devastating to the Planning Area. As a dry period progresses and water supplies dwindle, existing water supplies will be overtaxed and dry up. If the drought persists long term the impact of the drought could be permanent. Specific impacts may be:

- Economy: loss of revenue/income, higher rates of unemployment, loss of land value/prices
- Population density: there may be forced migration
- Health: dehydration, poor nutrition, famine
- Natural wildlife: wildlife will be competing for the same resources as people
- Land use: not all plant life will be able to survive in drought conditions changing availability of food for both people and wildlife. Erosion from flash floods, high winds, and possible wildfire from consistent dry conditions may change the landscape and natural habitats permanently.
- Damage or loss of infrastructure
- Social: conflict over resources

While all populations in the Planning Area are vulnerable, children, elderly, and the economically challenged populations are most at risk.

The unincorporated areas of Montgomery County, the cities of Black Springs, Mt. Ida, Norman, and Oden are mostly rural with a large amount of timber plantations, farmland, and pasture for farm animals. Farmers, ranchers, and private individuals own about 90% of the timberland in the Planning Area. Drought can have serious impact on farmland and agriculture. Failed crops, inability to maintain healthy livestock, and decreased land value/prices will cause economic strain. The landscape may be unable to adapt and could be permanently changed. Those who depend on the land for their livelihood may be forced to sell their herds, migrate in search of better grazing lands/fertile fields, or move to urban areas in search of employment. If the dwindling supplies of food are not replaced, famine can occur, further accelerating migration out of these jurisdictions.

The school districts of Caddo Hills, Mount Ida, and Ouachita River will also be greatly affected by the dwindling water supply. School schedules could be delayed or canceled altogether. Drought conditions could create famine worldwide, but locally they could create food insecurity for those students dependent on the school food program.

Severe droughts also elevate the potential for wildfires. Burned areas that were once forested or used as stock ponds may dry up permanently. The increased dry fuel load created by drought could ignite. The wildfire could ravage the Planning Area as well as surrounding Counties.

Population

Population changes would impact drought. As populations grow there is an increased strain on water supplies. The Planning Area has seen a decrease in population but an increase in industry that relies on the current water supply. Increased population and increased industry would stress the current water supply, without a drought. Drought conditions would expedite the impact. Over the next ten years the Planning Area plans to expand its water supply to meet the need of increased industry.

Land Use

Changes in land use could impact the Planning Area. The Planning Area has both agricultural and industrial areas. Both agriculture and industry are dependent on sustainable sources of water. Unsustainable land use by either agriculture or industry can lead to a breakdown of the ecosystem and environmental degradation. Over the next ten years the Planning Area will be working to increase water supply to meet the increased demand that is projected.

The Planning Area has not conducted a study to determine an increase or decrease in agriculture.

Over the next five years the Planning Team will need to research and document changes in land use and its effects on the Planning Area.

Climate

Climate change is expected to correlate with land use. Lack of green space, increased land use for agriculture, and waste from industry impact climate. The Planning Area contains large amounts of rural agricultural areas and is expected to see a growth in industry. The Planning Team will need to continue to research over the next five years the impact and possible natural mitigation methods that can be taken to prevent drought.

4.8.3 Earthquake

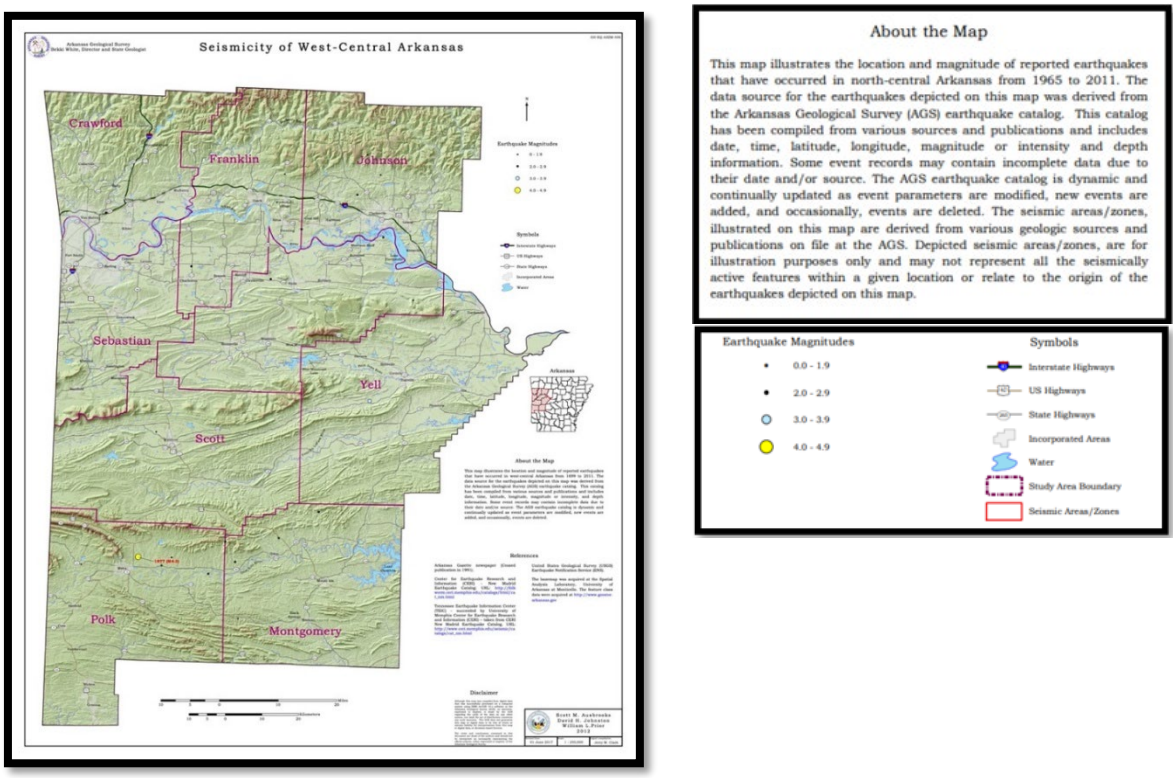
An earthquake is a sudden motion or trembling caused by an abrupt release of accumulated strain on the tectonic plates comprising the Earth's crust.

An earthquake is what happens when two blocks of the earth suddenly slip past one another. The surface where they slip is called the fault or fault plane. The location below the earth's surface where the earthquake starts is called the hypocenter, and the location directly above it on the surface of the earth is called the epicenter.

Sometimes an earthquake has foreshocks. These are smaller earthquakes that happen in the same place as the larger earthquake that follows. Scientists can't tell that an earthquake is a foreshock until the larger earthquake happens. The largest, main earthquake is called the mainshock. Mainshocks always have aftershocks that follow. These are smaller earthquakes that occur afterwards in the same place as the mainshock. Depending on the size of the mainshock, aftershocks can continue for weeks, months, and even years after the mainshock.

Locations affected by earthquake

The map below shows the location and magnitude of reported earthquakes that have occurred in the Planning Area from 1938-2007.



West Central Arkansas Seismic Zone PDF

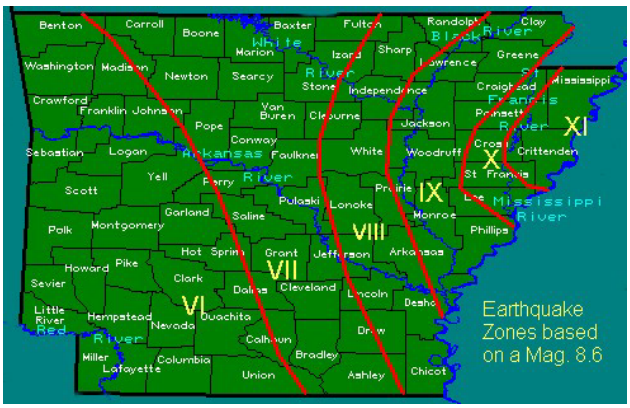
Extent, Magnitude or Severity of Earthquake Events

The Planning Area can expect to see earthquakes up to a magnitude of 5.0 on the Richter Scale. The area with the highest probability due to past recorded occurrences would be the city of Oden. According to USGS Earthquake data, the only earthquake that has previously occurred is northeast of the city of Oden. The earthquake was a 2.2M on the Richter Scale. Hot Springs and Hot Springs Village are the other nearby towns that could have experienced earthquake activity within the Planning Area. However, it is possible that any surroundings of the Planning Area could experience an earthquake (USGS Earthquake Map).

County	Location	Date	Time	Magnitude	Depth (km)
Montgomery	Oden	11/15/2010	6:01 PM	2.2	2.4

Category	Effects	Richter Scale (approximate)
I. Instrumental	Not felt	1-2
II. Just perceptible	Felt by only a few people, especially on upper floors of tall buildings	3
III. Slight	Felt by people lying down, seated on a hard surface, or in the upper stories of tall buildings	3.5
IV. Perceptible	Felt indoors by many, by few outside; dishes and windows rattle	4
V. Rather strong	Generally felt by everyone; sleeping people may be awakened	4.5
VI. Strong	Trees sway, chandeliers swing, bells ring, some damage from falling objects	5
VII. Very strong	General alarm; walls and plaster crack	5.5
VIII. Destructive	Felt in moving vehicles; chimneys collapse; poorly constructed buildings seriously damaged	6
IX. Ruinous	Some houses collapse; pipes break	6.5
X. Disastrous	Obvious ground cracks; railroad tracks bent; some landslides on steep hillsides	7
XI. Very disastrous	Few buildings survive; bridges damaged or destroyed; all services interrupted (electrical, water, sewage, railroad); severe landslides	7.5
XII. Catastrophic	Total destruction; objects thrown into the air; river courses and topography altered	8

The Arkansas Geological Survey confirms that damage is not a concern unless a quake has a magnitude of at least 4.0. As shown below, the Planning Area could experience up to a 5.0 magnitude earthquake on the Richter Scale.



Previous Occurrences

The New Madrid Seismic Zone is a very active geologic fault located closely to the State of Arkansas. Within the Planning Area, there has been a total of one earthquake. . According to

USGS Earthquake data, the only earthquake that has previously occurred is northeast of the city of Oden. The earthquake was a 2.2M on the Richter Scale. While a mild experience, this occurrence does serve to remind that the danger is still ever present (USGS Earthquake Map).

Probability of Future Events

The probability of an earthquake taking place in any given year is less than one percent. The probability of an earthquake was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 1974-2024 is equal to 18,250 days.

Vulnerability and Impact of Earthquakes

According to the Arkansas State Mitigation Plan the regions with the highest probability of impact and vulnerability are those located along the New Madrid Fault. The portions of Arkansas that are most likely to experience damage are located in the northeast part of the state. This does not include the Planning Area.

The Arkansas Geological Survey confirms that damage is not a concern unless a quake has a magnitude of at least a 4.0. The Planning Area is located in Earthquake Zone VI. This means the planning area could see an earthquake up to a 5.0 on the Richter Scale. Damage at this magnitude could result in cracked walls.

All buildings and infrastructure in the Planning Area are vulnerable to earthquakes. As businesses and residential areas grow so will the impact and vulnerability of the Planning Area. Growth in the number and size of both businesses and residential areas will require more mitigation efforts to address both new and existing structures.

Damage from an earthquake can be widespread and varied. Buildings can be structurally damaged or collapse depending on the magnitude of the earthquake. Furniture and equipment may be overturned or displaced. Windows could be broken or become unanchored from the structure. Mobile homes could be knocked off their foundations. Infrastructure and lifesaving services could be delayed, damaged, or destroyed by an earthquake. Depending on the magnitude of the earthquake, pipes carrying water and other utilities may become damaged. Hazardous material may be released. Services such as cell service and landlines may become unavailable due to damage or capacity limits.

The Planning Area includes populations under the age of 5, over the age of 65, special needs, and those living below the poverty level. These population are at risk of injury, death, or inability to recover from an earthquake.

The city of Mount Ida would be most affected by an earthquake (stronger than 4.0) due to the building density in the area. There are vulnerable commercial structures there that are constructed with unreinforced masonry. During a 7.0 magnitude earthquake, the walls of the buildings would crack, or collapse and windows would break. All furniture, equipment, and material inside the

buildings could be overturned or broken. Cars parked downtown could be rocked and displaced by the shaking and damaged or destroyed by falling debris.

The cities of Black Springs, Mount Ida, Norman, and Oden are located in rural areas. In these areas most housing is constructed with unreinforced masonry. The walls of the buildings could crack or collapse. The windows could be broken or destroyed. Mobile homes that are mounted on piers could be knocked off their foundations and dropped 24 to 36 inches before striking the ground. Any residents in mobile homes are vulnerable and would be knocked from their current position to the floor and injured or killed.

Caddo Hills and Mount Ida School District are located in the Planning Area. Some of the buildings are older and constructed with unreinforced masonry. The walls of the buildings could crack or collapse. Furniture and equipment inside the buildings would be overturned and displaced. Heavy furniture and equipment could strike students, faculty, or staff located in the buildings during an earthquake event. Due to the amount of people that could be in one area during an earthquake event, widespread panic could pose additional risk to those located on campus trying to exit the building and injuring others in their path.

Population

Population increase/decrease will not alter the probability of an earthquake event; however, changes in demographic, socioeconomic characteristics, and distribution of population can affect the vulnerability and impact of earthquakes. Higher population density and lower economic characteristics will result in increased vulnerability and impact. Over the next five years, the planning team should monitor increase/decrease of population and its impact. The mitigation plan should be updated for any significant changes.

Land Use

Sustainable urban resilience to natural disasters is a constant challenge. Lack of green space makes urban areas more vulnerable. Land use planning is an essential tool in promoting earthquake resilience. There have been no land use studies conducted for the Planning Area. Over the next five years the planning team should consider a land use study and update the mitigation plan with any significant changes.

Climate

Climate change does not have a direct impact on earthquake vulnerability, impact, or frequency.

4.8.4 Extreme Heat

Extreme Heat

There is no strict definition of extreme heat. The term is used to describe a hotter than normal period for the time and place of the extreme heat event.

Extreme heat is a dangerous weather condition. According to MIT it is the leading cause of weather-related deaths in the United States (https://climate.mit.edu/explainers/extreme-heat). Extreme heat effects:

- Health
- Roads
- Infrastructure
- Crops
- Livestock
- Escalates natural disasters like drought and wildfire

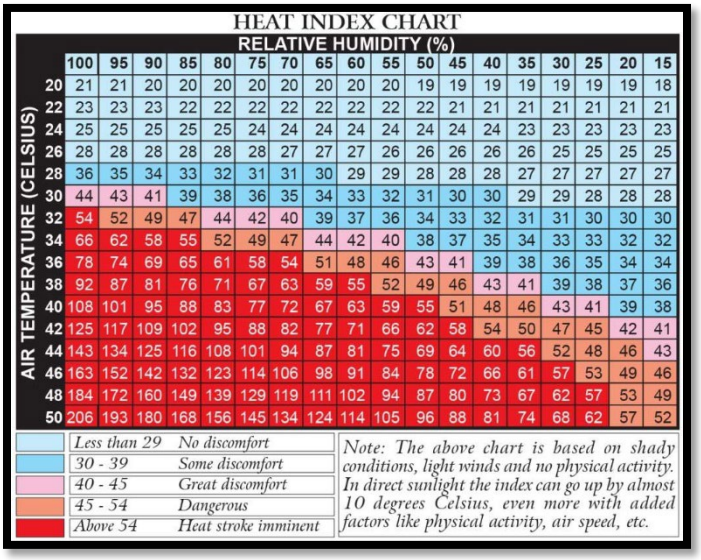
Locations Affected by Extreme Heat

There is no geographic hazard boundary for extreme heat. The entire Planning Area is a risk for extreme heat.

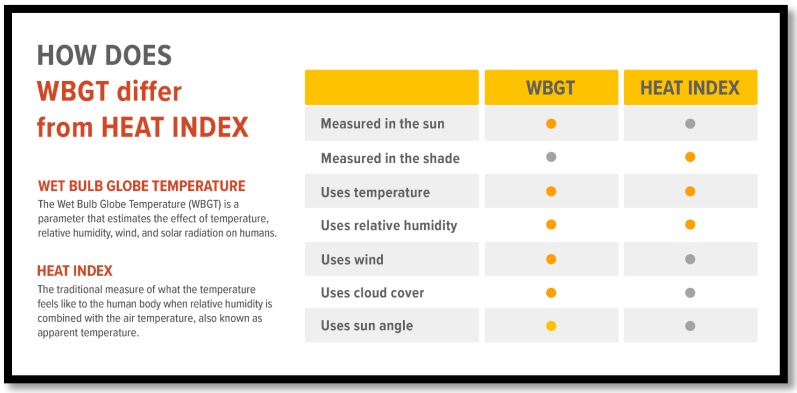
Extent, Magnitude, or Severity of Extreme Heat

The entire Planning Area can experience extreme heat seasonally. Temperatures in the summer months average between 80˚ and 115˚.

The magnitude or intensity of an extreme heat event is measured in relation to the percentage of humidity. According to the National Oceanic Atmosphere Administration (NOAA) this relationship is referred to as the "Heat Index". The Heat Index measures how hot it feels outside when humidity is combined with high temperatures. The Planning Area has seen heat indices near 120˚ (Storm Events Database - Event Details | National Centers for Environmental Information (noaa.gov)).



The heat index does not account for variables such as direct sunlight and wind speed. Many individuals in the Planning Area must perform activities outside, therefore these variables must be considered. A Wet Bulb Globe Temperature (WBGT) would be utilized to identify and notify when protective measures should be taken for outdoor work (Heat Forecast Tools (weather.gov)). The chart below is an example of the differences between heat index and WBGT.



Previous Occurrences

There have been zero previous occurrences of extreme heat between January 2000 and December 2023.

Storm Events Database Excessive Heat 2000-2023

Number of County/Zone areas affected:	0
Number of Days with Event:	0
Number of Days with Event and Death:	0

Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	0
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	0

Storm Events Database - Search Results | National Centers for Environmental Information (noaa.gov)

Probability of Future Events

The probability of an extreme heat event occurring in the Planning Area in any given year is less than one percent. The probability of an extreme heat event was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

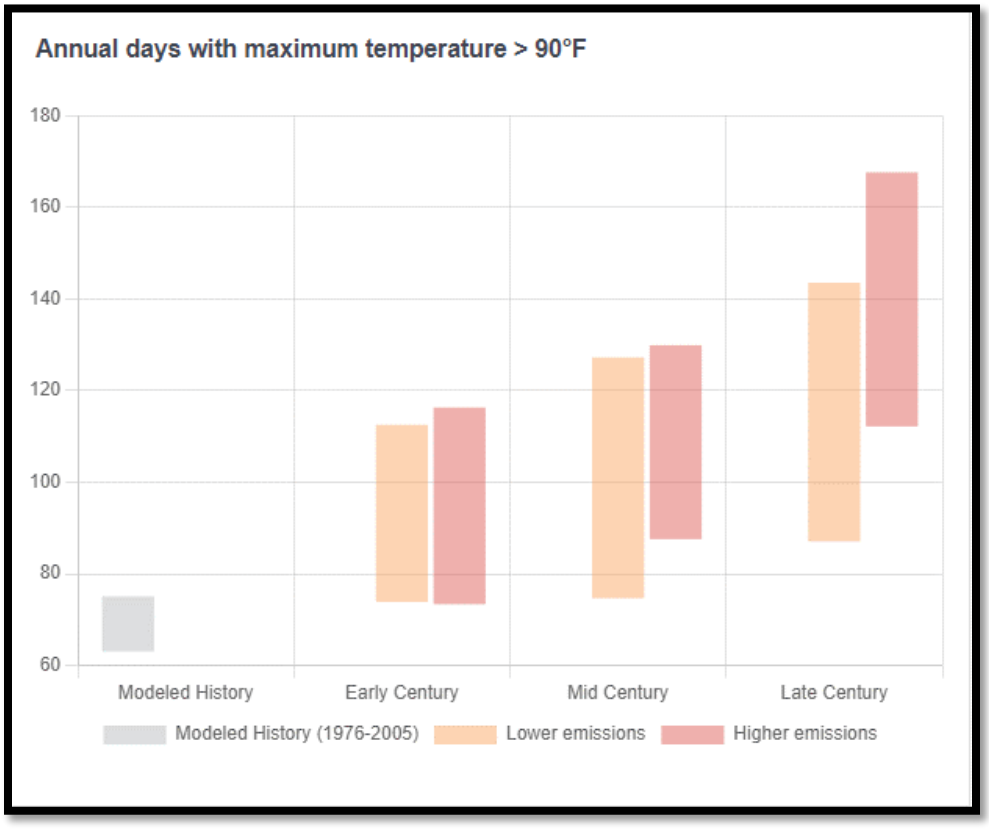
Data collected from 2000-2023 was equal to 8,395 days.

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Temperature thresholds:							
Annual days with maximum temperature > 90°F	63 days 63 - 75	92 days 74 - 113	95 days 73 - 116	103 days 75 - 127	111 days 88 - 130	114 days 87 - 144	142 days 112 - 168
Annual days with maximum temperature > 95°F	27 days 24 - 31	50 days 26 - 75	53 days 35 - 84	62 days 28 - 95	71 days 45 - 104	73 days 43 - 113	106 days 67 - 143
Annual days with maximum temperature > 100°F	7 days 6 - 9	19 days 5 - 37	21 days 7 - 54	27 days 6 - 57	35 days 15 - 84	36 days 12 - 57	68 days 30 - 117
Annual days with maximum temperature > 105°F	1 days 1 - 1	5 days 1 - 14	5 days 0 - 24	8 days 1 - 17	11 days 3 - 49	12 days 2 - 31	34 days 9 - 88
Annual temperature:							
Annual single highest maximum temperature °F	103 °F 101 - 105	106 °F 102 - 110	107 °F 103 - 113	108 °F 103 - 112	109 °F 105 - 116	110 °F 105 - 114	114 °F 107 - 126
Annual highest maximum temperature averaged over a 5-day period °F	99 °F 98 - 101	102 °F 98 - 106	103 °F 99 - 109	104 °F 99 - 108	105 °F 101 - 112	106 °F 101 - 110	110 °F 104 - 122
Cooling degree days (CDD)	1870 degree-days 1807 - 1956	2,362 degree-days 2,046 - 2,749	2,409 degree-days 2,086 - 2,829	2,602 degree-days 2,176 - 3,128	2,805 degree-days 2,369 - 3,563	2,856 degree-days 2,292 - 3,627	3,699 degree-days 2,867 - 4,672

Climate Projections for Early Century (2015–2044)	Lower emissions	Higher emissions
Annual days with maximum temperature > 90°F	92.1 Days + 25.1 since 1976-2005	94.6 Days + 27.6 since 1976-2005
Annual days with maximum temperature > 95°F	50.1 Days + 23.2 since 1976-2005	53.0 Days + 26.2 since 1976-2005
Annual days with maximum temperature > 100°F	18.7 Days + 11.8 since 1976-2005	21.0 Days + 14.0 since 1976-2005
Annual days with maximum temperature > 105°F	4.6 Days + 3.6 since 1976-2005	5.3 Days + 4.3 since 1976-2005
Annual single highest maximum temperature	106.4 °F + 3.3 since 1976-2005	107.1 °F + 4.0 since 1976-2005
Annual highest maximum temperature averaged over a 5-day period	102.4 °F + 3.3 since 1976-2005	103.0 °F + 3.9 since 1976-2005
Cooling-degree days (CDD)	2,361.9 Degree Days + 491.6 since 1976-2005	2,409.4 Degree Days + 539.1 since 1976-2005

CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)



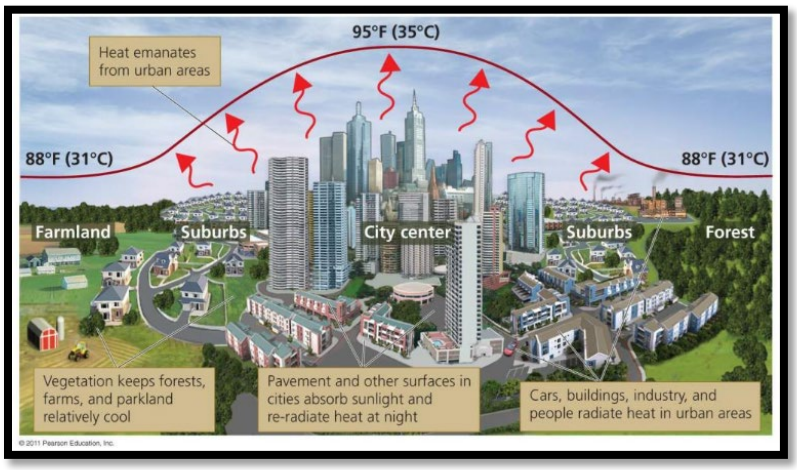
CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)

Vulnerability and Impact of Extreme Heat

The entire Planning Area could be impacted by extreme heat.

The populations vulnerable to an extreme heat event of the unincorporated areas of Montgomery County, cities of Black Springs, Mount Ida, Norman and Oden, and the school districts of Caddo Hills and Mount Ida are children under 5 years, the elderly over 65 years, tourists, and those living below the poverty level. For children and elderly, prolonged exposure to temperatures above 100 degrees Fahrenheit can cause significant health-related ailments that include heat stroke and even death. Building structures are not affected by extreme heat. It primarily affects elderly, children, homeless, agriculture, livestock, wildlife, water supply and timber plantations; however, it is important to note that urban areas are typically hotter than the surrounding rural areas. Construction materials such as asphalt absorb and re-omit more heat. This creates an urban heat island effect. Changing the natural landscape of an area destroys its ability to moderate air temperatures. Trees, plants, soil, and water can naturally lower air temperatures thru evaporative cooling (Urban Heat Islands | MIT Climate Portal).

Urban Heat Island Effect



urban heat island - Search Images (bing.com)

Populations located within the city of Mount Ida have an increased risk of heat injuries due to the lack of shade. It affects people of all ages, primarily the elderly, children and homeless. All agriculture crops, livestock, water supply and timber plantations are vulnerable to extreme heat. Heat exhaustion usually affects people who are working or exercising in a hot environment. No area can be said to be immune from, or any more or less vulnerable to extreme heat. Socioeconomic issues increase the risk of heat exhaustion if access to air conditioning is limited. During heat waves, large cities often open cooling centers to help minimize the risk of large numbers of people succumbing to heat-related illness. Tips for preventing heat-related illness can be found at Tips for Preventing Heat-Related Illness | Natural Disasters and Severe Weather | CDC.

The rural, natural landscape within the Planning Area is less altered than more urbanized areas. However, rural areas may be vulnerable to extreme heat. The rising temperatures may impact people, the natural environment, wildlife, livestock, and farmland. Extreme heat may result in people, the natural environment, wildlife, livestock, and farmland to increase water usage. Extreme heat may cause water sources to run short or dry up.

Extreme heat may impact the growth cycle production of many crops. In extreme heat crops may become stressed causing crop production to be altered or fail. Rate of plant growth and development is dependent on the surrounding temperatures. Root development may be altered depending on the amount of moisture in the soil. Pollinators such as bees may be harmed by extreme heat. Dry soil and crops may become prone to drought and wildfire. The economic loss may be felt by the farmer, community or global economy creating a food shortage.

Extreme heat may impact livestock. As temperatures rise livestock will require more water. During extreme heat water sources may become low or dry up. Heat stress can increase vulnerability to disease, reduce fertility, and reduce milk production. Heat stress is one of the major climate change impacts on domesticated livestock. Livestock is responsible for revenue that exceeds $140 million in the Planning Area.

During extreme heat the natural environment such as trees and wildlife also compete for water resources. Tree growth may be altered due to the availability of water. Wildlife is at a higher risk of disease. Extreme heat may result in drought and an increase in wildfire. The natural environment may be permanently altered or destroyed.

Population

Population changes in size and spatial distribution may have an impact on extreme heat. The Planning Area has seen a decrease in population. There have been no specific studies performed in the Planning Area to document the impact and extent of population changes. Over the next five years the Planning Team will need to research how population changes and distribution are affecting the Planning Area.

Land Use

Land cover plays a vital role in controlling the amount of heat absorbed/radiated by the environment. Temperatures rise in urban areas due to the concentration of asphalt and other materials while rural areas with larger portions of green space remain cooler. There have been no studies in the Planning Area for land use and its effect on extreme heat. Over the next five years the Planning Team will need to research and document heat mitigation. Heat mitigation involves changing land use to reduce the heat island effect.

Climate

The Planning Area has already experienced rising temperatures and extreme highs. Future climate mapping indicators predict rising temperatures. With the expected growth in industry, it will be important for the Planning Team to research, document and mitigate against rising temperatures.

4.8.5 Flood

Flood is defined as an overflowing of a large amount of water beyond its normal confines, especially over what is normally dry land. It can be a partial or complete inundation. The various types of flooding in the Planning Area include riverine flooding, urban flooding, shallow flooding, and flash flooding.

Riverine flooding occurs from excessive rainfall in upstream area that gradually cause rivers and streams to overflow their banks inundating the adjacent floodplains. However, it can also be caused by runoff, snowmelt, or dam release. This type of flooding typically lasts longer than flash flooding or shallow flooding. This type of flooding often causes more damage due to the length of tie structures are inundated, the velocity and depth of water and size/force of floating debris.

Urban flooding occurs when heavy rainfall runs off structures, parking lots and streets. It converges in culverts and drainage ways that are often clogged with debris, causing streets to flood and storm sewers to back up.

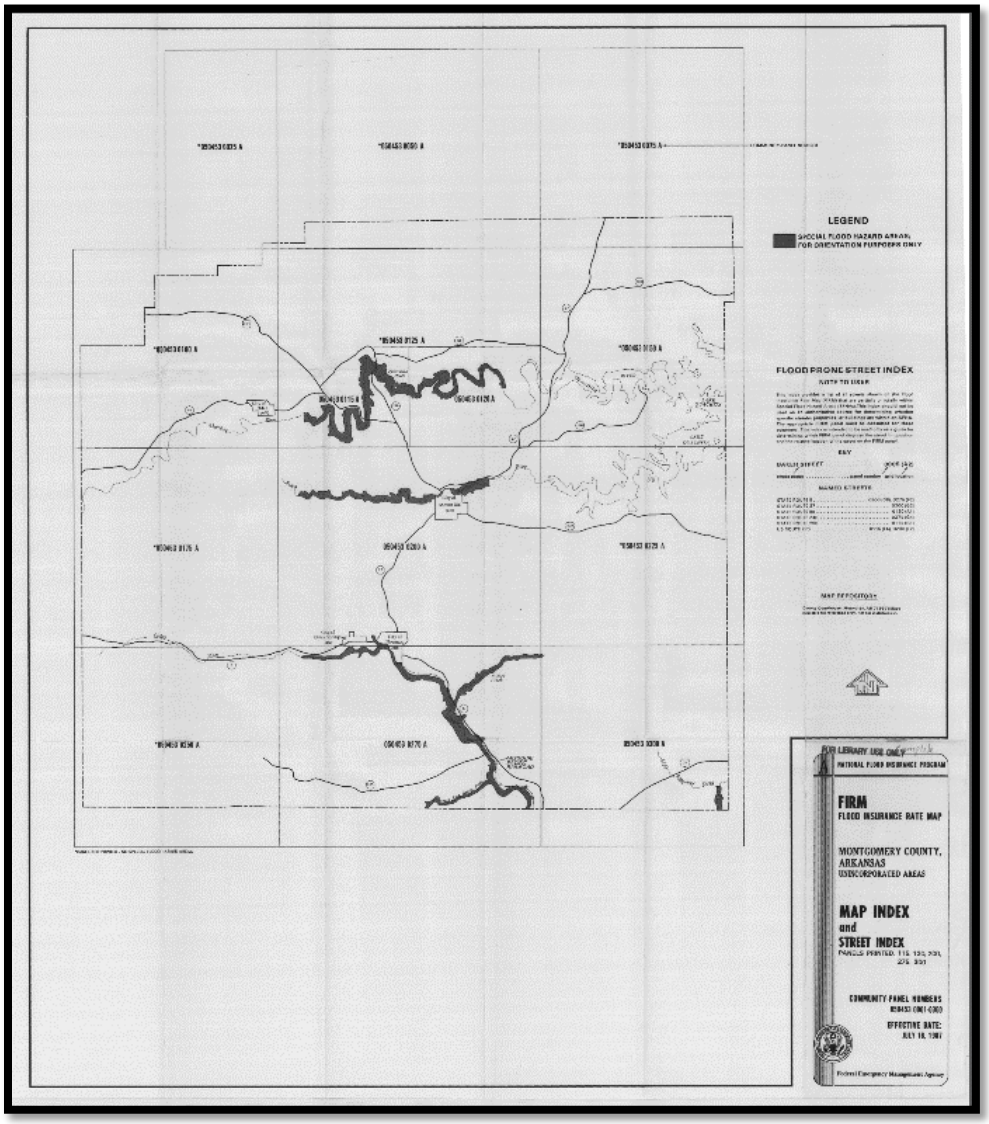
Shallow flooding is defined as flooding with an average depth limited to 3 feet or less where no defined channel exists.

A flash flood is caused by heavy or excessive rainfall in a short period of time, usually less than 6 hours. Flash floods can reach peak flow within a few minutes. They are usually characterized by raging torrents and move with great force and velocity. They can sweep through riverbeds, urban streets, or mountain canyons sweeping everything in their path, rolling boulders, tearing out trees and destroying structures.

Flooding can result in damage to personal property, buildings, and infrastructure. In addition to property destruction, flooding can lead to injuries or even fatalities.

Locations Affected by Flooding

FIRM Panel Index 050453IND0

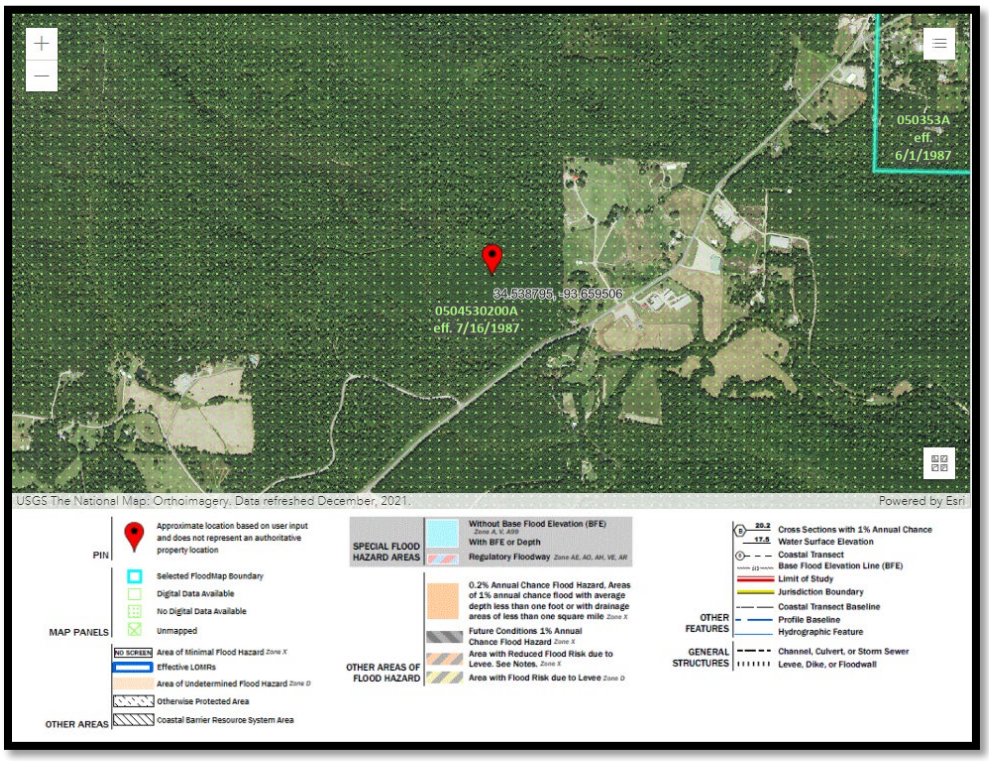


The FIRM Panel index for the Planning Area and can be found at the following link: https://map1.msc.fema.gov/firm?id=050453IND0.

There are a total of 6 panels that make up the planning area.

The Flood Insurance Rate Maps (FIRM) inserted below depict the locations of flood zones withing each jurisdiction. The entire planning area has potential to be affected by one or more of the flood events described above, even if they are not directly located in a designated flood zone.

Montgomery County Unincorporated Flood Map 0504530200A Effective 7/16/1987

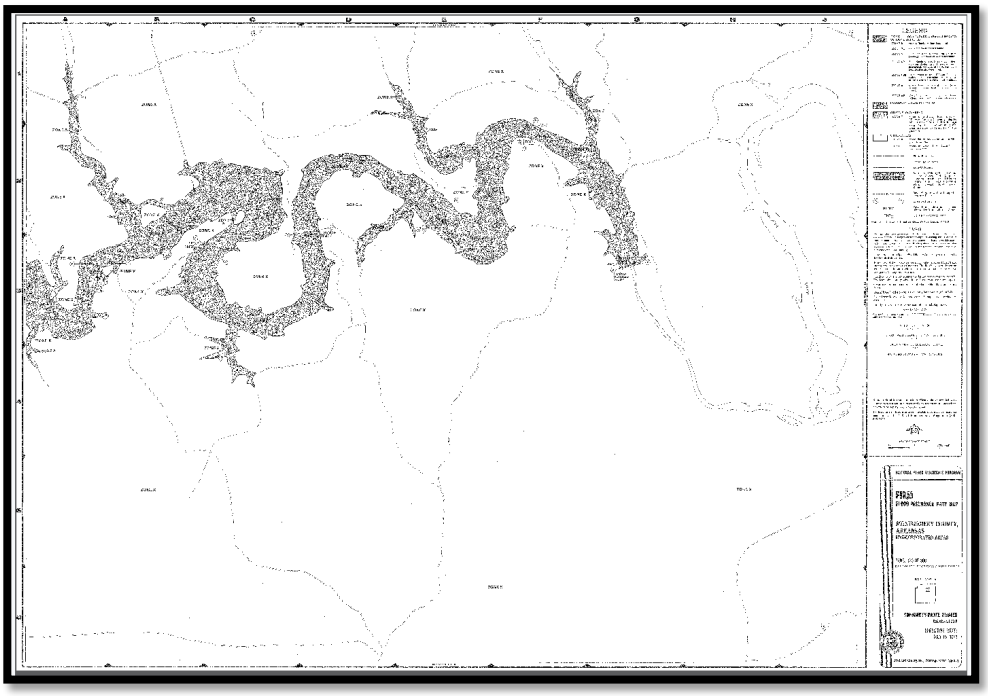


FEMA Flood Map Service Center | Search By Address

Montgomery County Unincorporated FIRM 0504530115A Effective 7/16/1987

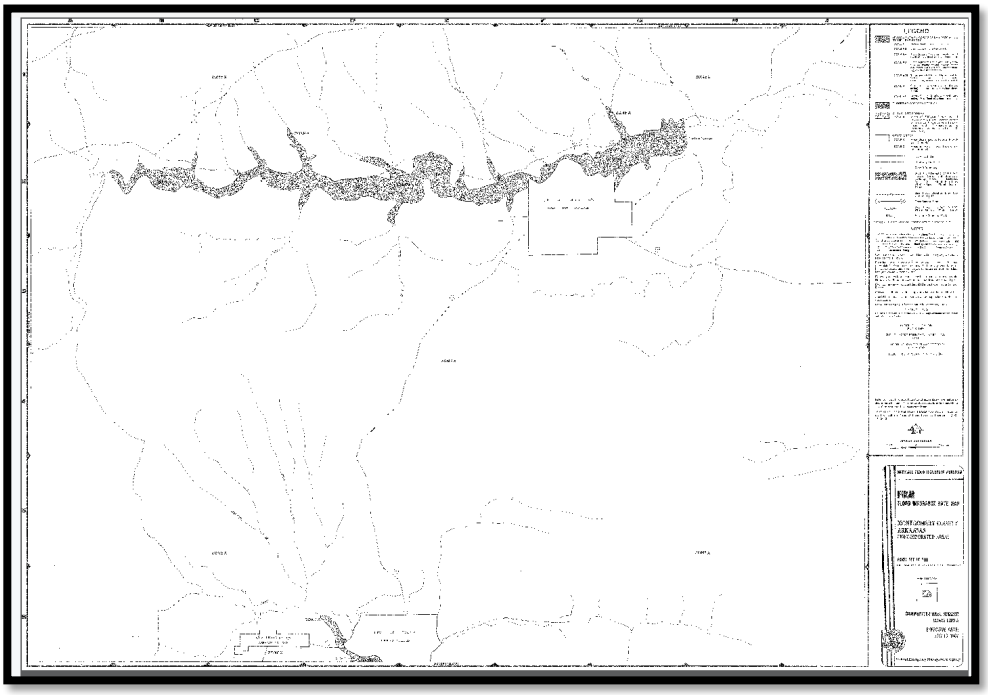
https://map1.msc.fema.gov/firm?id=0504530115A

Montgomery County Unincorporated FIRM 0504530120A Effective 7/16/1987



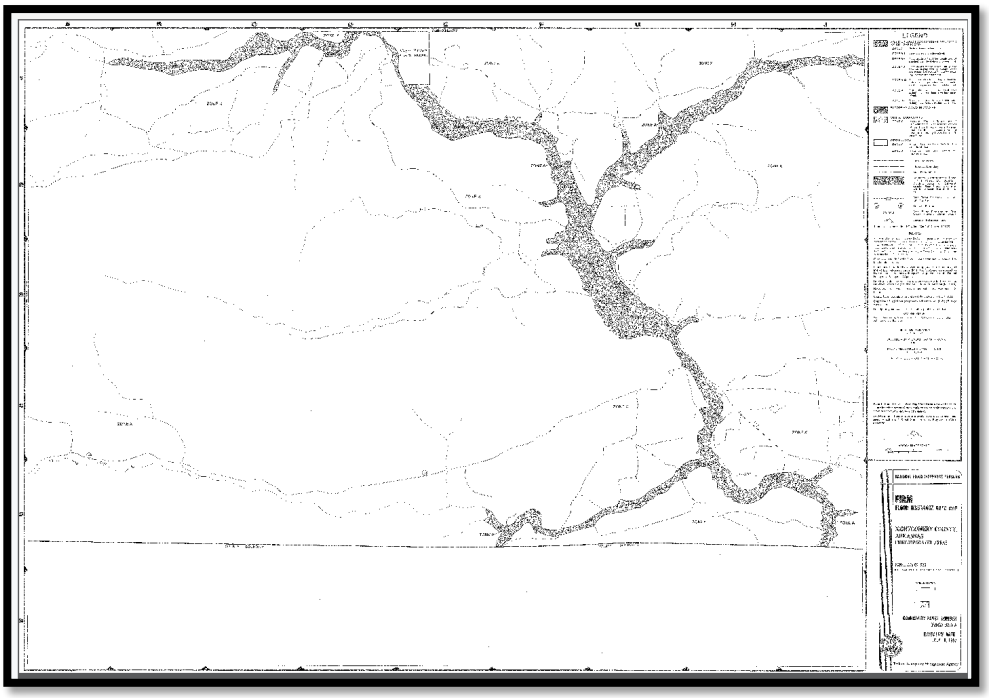
https://map1.msc.fema.gov/firm?id=0504530120A

Montgomery County Unincorporated FIRM 0504530200A Effective 7/16/1987



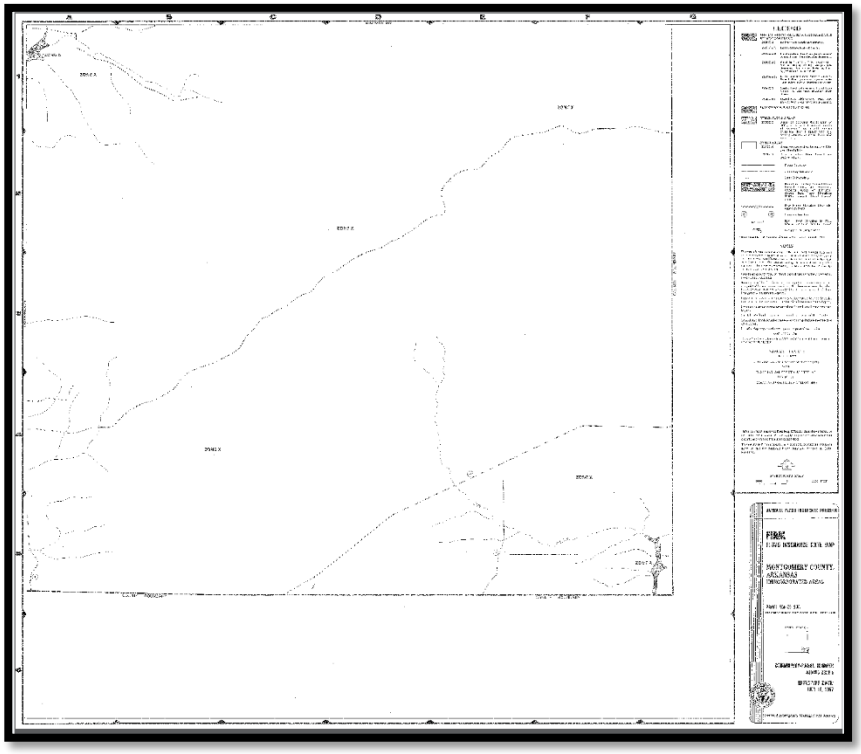
https://map1.msc.fema.gov/firm?id=0504530200A

Montgomery County Unincorporated FIRM 0504530275A Effective 7/16/1987



https://map1.msc.fema.gov/firm?id=0504530275A

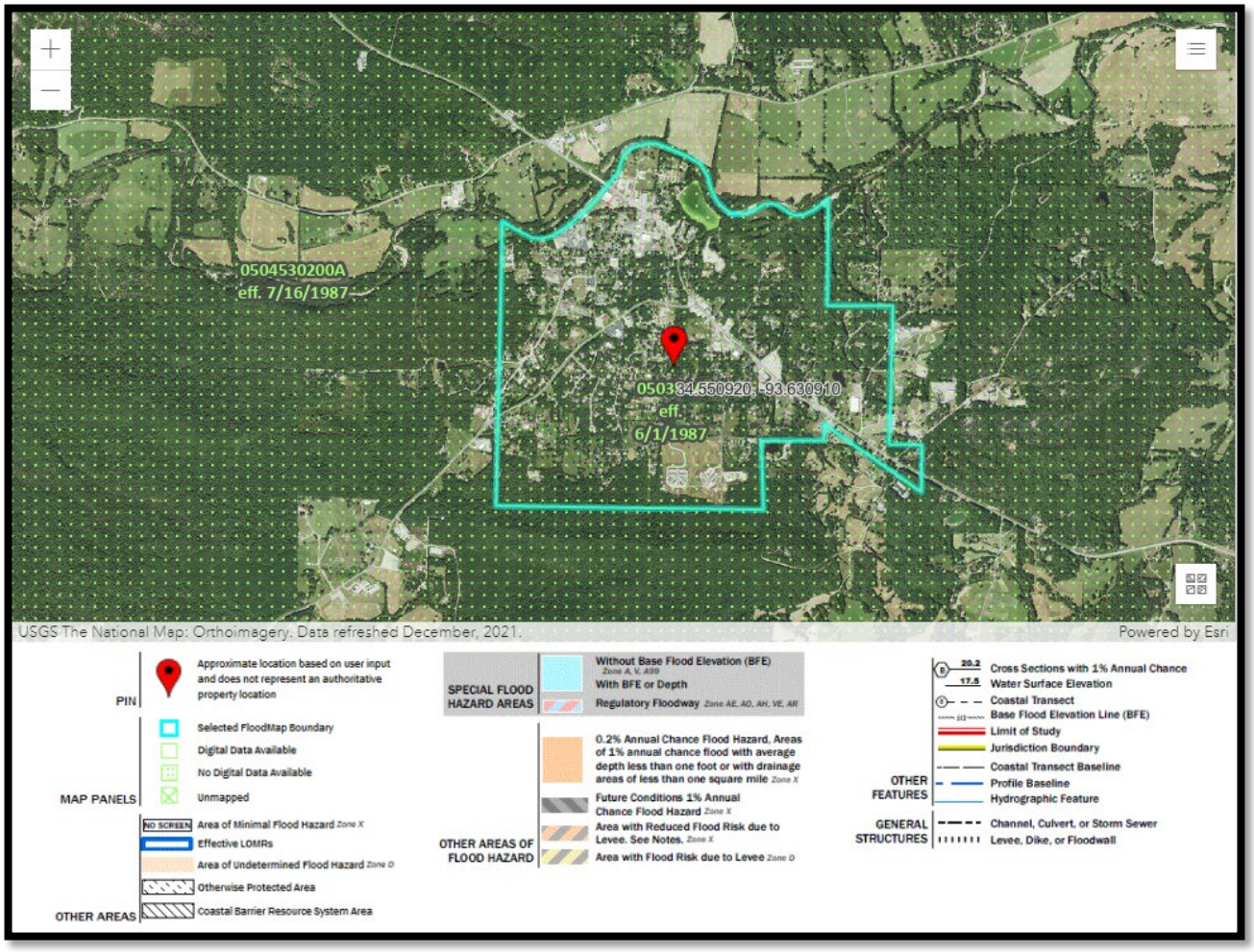
Montgomery County Unincorporated FIRM 0504530300A Effective 7/16/1987



https://map1.msc.fema.gov/firm?id=0504530300A

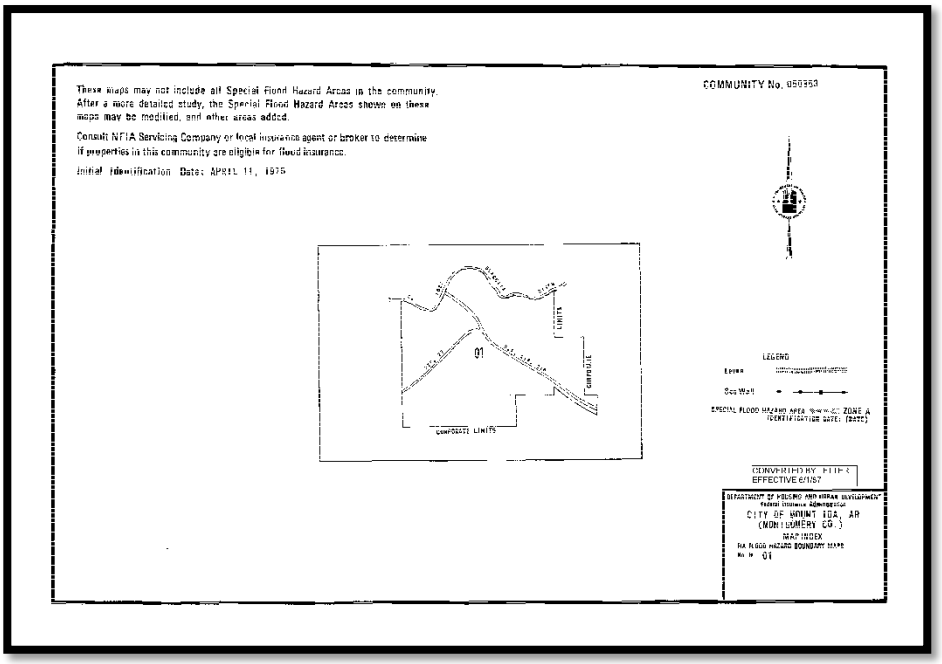
City of Mount Ida

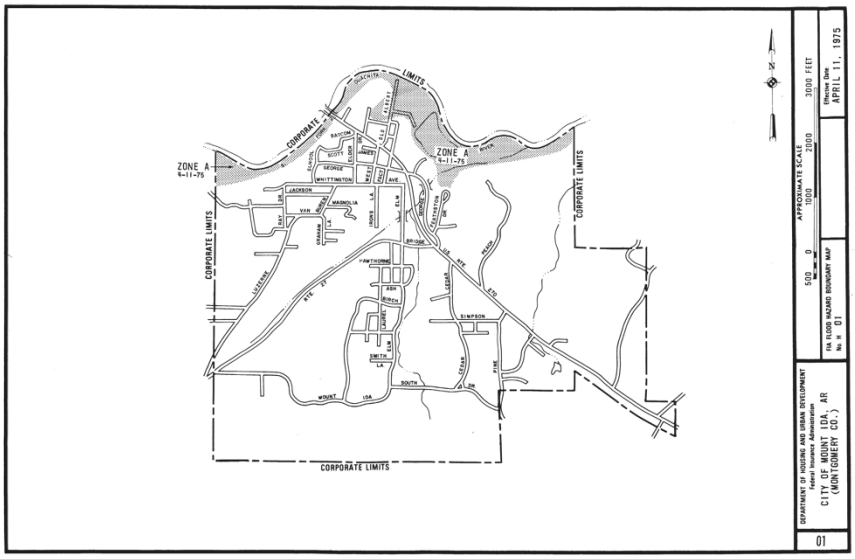
Flood Map 050353A



FEMA Flood Map Service Center | Search By Address

FIRM 050353A Effective 06/01/1987

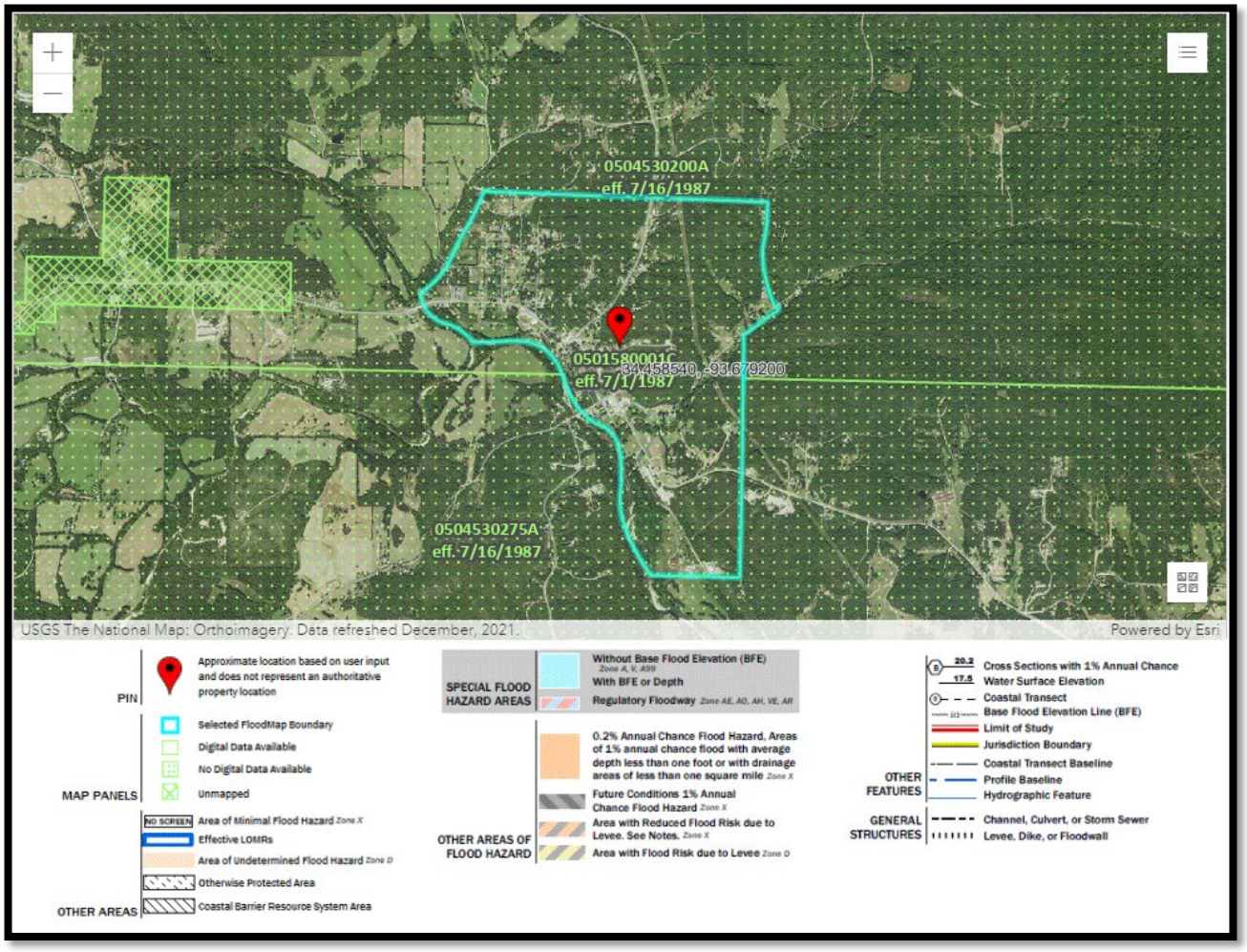




https://map1.msc.fema.gov/firm?id=050353A

City of Norman

Flood Map 0501580001C Effective 7/1/1987



FEMA Flood Map Service Center | Search By Address

FIRM 0501580001C Effective 07/01/1987

https://map1.msc.fema.gov/firm?id=0501580001C

Extent, Magnitude, or Severity of Flood

For flooding, location refers to areas of the planning area that are at the highest risk of flooding frequently. Location is based on FIRM mapping and data from communities in the planning area.

The unincorporated jurisdictions of Montgomery County may expect flash flooding events when receiving 3" or more rainfall. Other locations may experience minor to moderate flood events:

- Hwy 270 near Camp Ozark
- Barbie Lane
- Manfred Road
- Arkansas Hwy 298 near Breezy Point Road

The city of Black Springs may expect flash flooding events when receiving 3" or more rainfall. Other locations may experience minor to moderate flood events:

- Ark Hwy 8
- River Road
- Gaston Road

The city of Mount Ida may expect flash flooding events when receiving 3" or more rainfall. Other locations may experience minor to moderate flood events:

- Areas located around the East and West side of Highway 270
- Gloryland Road

The city of Norman can expect flash flooding events when receiving 3 inches or more of rainfall. Other locations may experience minor to moderate flood events:

- Polk Creek Road
- Golf course Road
- Smokey Hollow Road

The city of Oden may experience one or more defined flood events and is located in a Special Flood Hazard Area. Other locations may experience minor to moderate flood events:

- Ouachita Avenue
- Hwy 88 near Big Brushy Creek
- Brushy Road

All portions of the Planning Area are expected to receive the same amount of rainfall.

Flood severity categories used by the National Weather Service (NWS) include minor flooding, moderate flooding, and major flooding. Each category has a definition based on property damage and public threat.

Severity	Impact
Minor Flooding	Minimal or no property damage, but possibly some public threat or inconvenience
Moderate Flooding	Some inundation of structures and roads near streams. Some evacuations of people and/or transfer of property to higher elevations are necessary.
Major Flooding	Extensive inundation of structures and roads. Significant evacuations of people and/or transfer of property to higher elevations.

Previous Occurrences

The planning area suffered 42 flooding events between January 1, 2000, and January 31, 2023, resulting in $9,882,000.00 in property losses and $0.00 in crop losses.

There were 51 flash flood events reported between 01/01/2000 and 12/31/2023.

Number of County/Zone areas affected:	1
Number of Days with Event:	42
Number of Days with Event and Death:	1
Number of Days with Event and Death or Injury:	2
Number of Days with Event and Property Damage:	16
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								20	27	9.882M	0.00K
NORMAN	MONTGOMERY CO.	AR	09/08/2001	22:45	CST	Flash Flood		0	0	0.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	09/08/2001	22:45	CST	Flash Flood		0	0	0.00K	0.00K
COUNTYWIDE	MONTGOMERY CO.	AR	12/16/2001	13:30	CST	Flash Flood		0	0	0.00K	0.00K
SIMS	MONTGOMERY CO.	AR	05/16/2003	14:05	CST	Flash Flood		0	0	0.00K	0.00K
ODEN	MONTGOMERY CO.	AR	05/16/2003	14:12	CST	Flash Flood		0	0	0.00K	0.00K
ODEN	MONTGOMERY CO.	AR	03/18/2004	01:35	CST	Flash Flood		0	0	0.00K	0.00K

HOPPER	MONTGOMERY CO.	AR	10/27/2004	10:30	CST	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	01/13/2007	14:00	CST-6	Flash Flood		0	0	2.50K	0.00K
MT IDA	MONTGOMERY CO.	AR	03/18/2008	18:55	CST-6	Flash Flood		0	0	0.00K	0.00K
FANCY HILL	MONTGOMERY CO.	AR	04/03/2008	22:00	CST-6	Flash Flood		0	0	25.00K	0.00K
STORY	MONTGOMERY CO.	AR	07/05/2008	15:30	CST-6	Flash Flood		0	0	0.00K	0.00K
SILVER	MONTGOMERY CO.	AR	08/21/2008	09:30	CST-6	Flash Flood		0	0	0.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	09/02/2008	18:45	CST-6	Flash Flood		0	0	50.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	09/02/2008	21:00	CST-6	Flash Flood		0	0	100.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	05/14/2010	21:06	CST-6	Flash Flood		0	0	1.00K	0.00K
SIMS	MONTGOMERY CO.	AR	05/20/2010	00:00	CST-6	Flash Flood		0	0	25.00K	0.00K
SLATINGTON	MONTGOMERY CO.	AR	06/11/2010	02:00	CST-6	Flash Flood		20	24	9.000M	0.00K
PENCIL BLUFF	MONTGOMERY CO.	AR	07/25/2010	21:10	CST-6	Flash Flood		0	0	2.00K	0.00K
MANFRED	MONTGOMERY CO.	AR	04/25/2011	16:09	CST-6	Flash Flood		0	0	5.00K	0.00K
ALBERT	MONTGOMERY CO.	AR	05/01/2011	00:00	CST-6	Flash Flood		0	0	10.00K	0.00K
SWEETHOME	MONTGOMERY CO.	AR	05/24/2011	00:00	CST-6	Flash Flood		0	0	1.00K	0.00K
MT IDA BEARCE ARPT	MONTGOMERY CO.	AR	06/12/2012	05:00	CST-6	Flash Flood		0	0	5.00K	0.00K

HOG JAW	MONTGOMERY CO.	AR	01/12/2013	18:15	CST-6	Flash Flood		0	0	5.00K	0.00K
PENCIL BLUFF	MONTGOMERY CO.	AR	05/30/2013	18:00	CST-6	Flash Flood		0	3	500.00K	0.00K
PENCIL BLUFF	MONTGOMERY CO.	AR	06/01/2013	09:30	CST-6	Flash Flood		0	0	10.00K	0.00K
ALBERT	MONTGOMERY CO.	AR	01/03/2015	01:30	CST-6	Flash Flood		0	0	0.00K	0.00K
WELSH	MONTGOMERY CO.	AR	05/11/2015	02:00	CST-6	Flash Flood		0	0	100.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	06/26/2015	20:00	CST-6	Flash Flood		0	0	0.00K	0.00K
CADDO GAP	MONTGOMERY CO.	AR	12/27/2015	23:08	CST-6	Flash Flood		0	0	0.00K	0.00K
CADDO GAP	MONTGOMERY CO.	AR	04/29/2016	09:38	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	04/29/2016	22:00	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	08/20/2016	10:45	CST-6	Flash Flood		0	0	0.00K	0.00K
ALBERT	MONTGOMERY CO.	AR	08/20/2016	13:11	CST-6	Flash Flood		0	0	0.00K	0.00K
NORMAN	MONTGOMERY CO.	AR	04/29/2017	21:20	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	04/29/2017	22:00	CST-6	Flash Flood		0	0	0.00K	0.00K
CADDO GAP	MONTGOMERY CO.	AR	02/23/2018	06:13	CST-6	Flash Flood		0	0	0.00K	0.00K
NORMAN	MONTGOMERY CO.	AR	03/01/2018	00:00	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	06/13/2018	15:15	CST-6	Flash Flood		0	0	0.00K	0.00K

CADDO GAP	MONTGOMERY CO.	AR	10/31/2018	17:16	CST-6	Flash Flood		0	0	0.00K	0.00K
HOPPER	MONTGOMERY CO.	AR	07/16/2019	06:00	CST-6	Flash Flood		0	0	0.00K	0.00K
NORMAN	MONTGOMERY CO.	AR	05/16/2020	19:59	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	05/17/2020	00:00	CST-6	Flash Flood		0	0	0.00K	0.00K
ALAMO	MONTGOMERY CO.	AR	05/17/2020	00:00	CST-6	Flash Flood		0	0	0.00K	0.00K
NORMAN	MONTGOMERY CO.	AR	05/23/2020	01:30	CST-6	Flash Flood		0	0	40.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	08/29/2020	20:45	CST-6	Flash Flood		0	0	0.00K	0.00K
STORY	MONTGOMERY CO.	AR	08/31/2020	08:27	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	09/01/2020	05:30	CST-6	Flash Flood		0	0	0.00K	0.00K
MT IDA	MONTGOMERY CO.	AR	09/01/2020	08:30	CST-6	Flash Flood		0	0	0.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	04/25/2022	12:44	CST-6	Flash Flood		0	0	0.00K	0.00K
SIMS	MONTGOMERY CO.	AR	06/10/2022	08:00	CST-6	Flash Flood		0	0	0.00K	0.00K
STORY	MONTGOMERY CO.	AR	06/10/2022	08:52	CST-6	Flash Flood		0	0	0.00K	0.00K
Totals:								20	27	9.882M	0.00K

NOAA Storm Event Database

On May 23, 2020, flash flooding washed down the Caddo River near the town of Norman. Numerous county streets were flooded. Tents and at least one vehicle were washed into the Caddo River due to quick moving water. This flood event resulted in $40,000.00 in property damage. No injuries were reported from this event due to Montgomery County Sherriff's office prior evacuation of the area.

There were 4 flood events reported between 01/01/2000 and 12/31/2023.

Number of County/Zone areas affected:	1
Number of Days with Event:	4
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	3
Number of Days with Event and Crop Damage:	1
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	1.025M	250.00K
PENCIL BLUFF	MONTGOMERY CO.	AR	04/26/2011	02:00	CST-6	Flood		0	0	250.00K	0.00K
PENCIL BLUFF	MONTGOMERY CO.	AR	05/01/2011	00:00	CST-6	Flood		0	0	750.00K	250.00K
WASHITA	MONTGOMERY CO.	AR	05/31/2013	00:00	CST-6	Flood		0	0	0.00K	0.00K
WASHITA	MONTGOMERY CO.	AR	06/01/2013	00:00	CST-6	Flood		0	0	25.00K	0.00K
Totals:								0	0	1.025M	250.00K

NOAA Storm Event Database

May 5, 2011, there was widespread flooding in Arkansas. The flooding was caused by large amounts of rain on May 1 and May 2. This caused high water to flow down from Missouri and backwater flooding from rivers and large creeks/bayous. The Mississippi River was also experiencing unusually high stages, causing the White and Arkansas Rivers to back up near the river's confluence. The Arkansas Farm Bureau estimated that more than one million acres of farmland was under water in the State. Pencil Bluff sustained $750,000.00 in property damage and $250,000.00 in crop damage.

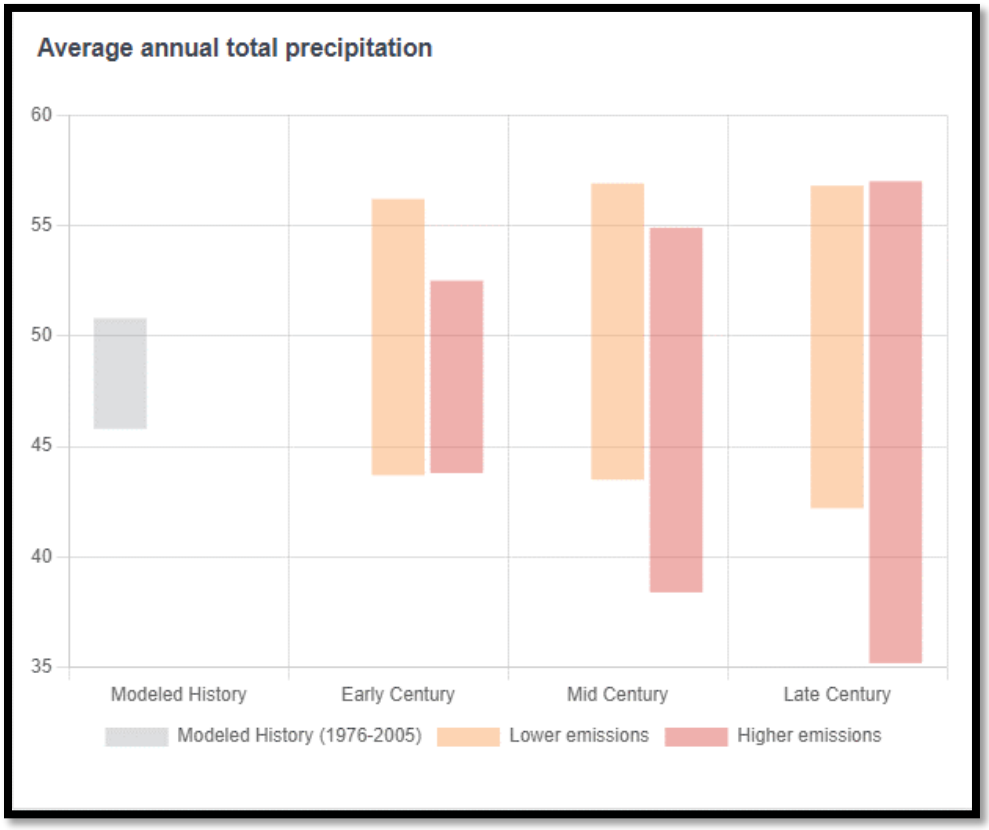
Probability of Future Flood Events

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Annual average total precipitation	**48"** 46 - 51	**49"** 44 - 56	**49"** 44 - 52	**49"** 44 - 57	**49"** 38 - 55	**49"** 42 - 57	**49"** 35 - 57
Days per year with precipitation (wet days)	**163 days** 156 - 170	**159 days** 146 - 170	**158 days** 132 - 168	**158 days** 142 - 170	**156 days** 122 - 174	**157 days** 140 - 171	**152 days** 110 - 175
Maximum period of consecutive wet days	**12 days** 10 - 13	**12 days** 10 - 15	**12 days** 9 - 15	**12 days** 9 - 16	**12 days** 9 - 15	**12 days** 9 - 15	**12 days** 9 - 14
Annual days with:							
Annual days with total precipitation > 1inch	**9 days** 8 - 10	**9 days** 8 - 11	**10 days** 8 - 12	**10 days** 8 - 12	**10 days** 7 - 12	**10 days** 8 - 12	**10 days** 7 - 14
Annual days with total precipitation > 2 inches	**1 days** 1 - 1	**1 days** 1 - 2	**1 days** 1 - 2	**1 days** 1 - 2	**1 days** 1 - 2	**1 days** 1 - 2	**2 days** 1 - 3
Annual days with total precipitation > 3 inches	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 0	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 1	**0 days** 0 - 1
Annual days that exceed 99th percentile precipitation	**7 days** 7 - 7	**7 days** 7 - 8	**8 days** 8 - 9	**8 days** 8 - 8	**9 days** 8 - 9	**8 days** 8 - 9	**9 days** 9 - 10
Days with maximum temperature below 32 °F	**4 days** 3 - 5	**2 days** 1 - 4	**2 days** 1 - 3	**2 days** 0 - 4	**1 days** 0 - 3	**1 days** 0 - 3	**0 days** 0 - 2

N/A = Data Not Available for the selected area

Climate Projections for Early Century (2015–2044)	Lower emissions	Higher emissions
Average annual total precipitation	48.8 Inches + 0.5 since 1976-2005	49.0 Inches + 0.7 since 1976-2005
Days per year with precipitation (wet days)	159.0 Days - 3.6 since 1976-2005	158.1 Days - 4.5 since 1976-2005
Maximum number of consecutive wet days	12.0 Days + 0.3 since 1976-2005	11.8 Days + 0.1 since 1976-2005
Annual days with total precipitation > 1 inch	9.5 Days + 0.4 since 1976-2005	9.8 Days + 0.8 since 1976-2005
Annual days with total precipitation > 2 inches	1.1 Days + 0.2 since 1976-2005	1.2 Days + 0.2 since 1976-2005
Annual days with total precipitation > 3 inches	0.2 Days No change since 1976-2005	0.3 Days + 0.1 since 1976-2005
Annual days that exceed 99th percentile precipitation	7.4 Days + 0.6 since 1976-2005	8.1 Days + 1.2 since 1976-2005



CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)

Climate mapping trends do not show a significant change in precipitation and how it relates to flooding. There is a slight increase in annual average total precipitation with a slight decrease in wet days per year. Data for the annual days with total precipitation for less than 1 inch, less than 2 inches, and less than 3 inches remains consistent with no trending changes.

The probability for a flood event occurring in the Planning Area in any given year is less than one percent. The probability for a flood event was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

Vulnerability and Impact of Flood

All areas of unincorporated areas of Montgomery County, Cities of Black Springs, Mount Ida, Norman, and Oden, school districts of Caddo Hills, Mount Ida and the Oden campus of the Ouachita River School District can experience some type of flash flooding. Detailed FIRM maps do not exist at this time to detail the scope of flooding that could occur in the areas of Black

Springs, Mount Ida, Norman, and Oden as well as the school districts of Caddo Hills and Mount Ida.

Past occurrences have caused traffic problems by cutting off streets. Parked cars have been carried off by the strong currents of the flash floods.

Flood waters have interrupted gas, electricity and water services and contaminated the water supply, making drinkable water unavailable.

Tourists visiting Albert Pike Recreation Area on the Little Missouri River have lost their lives in flash flooding incidents. Autos and homes are overtaken quickly by fast-rising flood waters in the unincorporated areas of Montgomery County.

Homes, personal belongings, and businesses were damaged or lost entirely because of ravages of past flooding occurrences. There have also been issues with the maintenance and clearing of drainage channels in this area that have resulted in obstructions restricting the flow of water during a storm.

According to the NCDC Storm Events, the northern half of the county that includes the cities of Mount Ida, Oden, and unincorporated areas of Montgomery County is more susceptible to and has experience more flood and flash flood events than the southern portion due to the location of the flood zones. Due to the location of Mount Ida City Hall, Police Station, and Fire Station, there should be little to no impact on these facilities due to flooding.

Economic

Residential loss or damage. Businesses also suffer, not only from the loss of property, but the lack of customers during the flood and recovery. Farmers suffer from the loss of their crops.

Financial

Residents who do not carry flood insurance suffer a great financial hardship. Those who do have insurance get help with the clean-up, but some costs may still come out of pocket. Towns and cities impacted by a flood carry the financial burden of fixing the public buildings, roads and other structures damaged by the flood waters. People who are impacted by the flood may also lose wages because the business they work for suffered damages or they are unable to get to work.

Health

Flood waters can also damage the health of those living and working in the area. Because flood waters can wash dangerous waste into water supplies, tap water may become unsafe to use if the local authorities do not issue a boil advisory warning everyone to boil water before ingesting it. Mold is also likely to grow in homes and other buildings engulfed by the flood waters. It is important to search all homes for mold and remove it completely before moving back in. Breathing the mold spores is dangerous for your health. A flood can also contribute to other health problems from human waste contaminating the ground.

Safety

Once flooding begins, strong currents can pull a grown man beneath the water to drown. Once the flood waters have settled, it is still unsafe to wander through the water by car or on foot. Deep spots may be undetectable and there may be electric currents running through the water.

Rural Impact

Floods damage farmland by burying crops in silt, uprooting crops by the force of the water or drowning crops. Flood waters can drown livestock as well. Flooding devastates wetlands and other wildlife habitats by depositing massive amounts of silt or leaving behind toxic substances such as petroleum products, fertilizers and pesticides and other man-made chemicals. This can kill animals and lead to water and land pollution.

Disease

Flooding increases human exposure to dysentery and other diseases. Flooded sewage treatment plants contaminate drinking water supp

Population

Population may have an impact on flood events when there is a shift in population size and composition. Population growth and urbanization alter the natural landscape. This results in loss/addition of natural landscaping such as trees, grass, and rock. Building structures to accommodate growth influences climate and the natural path of water flow. Population growth/density will place a larger number of people at risk for injury or death. The shift could create limited escape routes. Rising populations could mean that more people are vulnerable to a flood event. Population growth will increase the need for mitigation measures to protect people, property, resources, and the natural environment.

The Planning Area is currently trending a decrease in population. There have been no research studies on population and flood risk for the Planning Area. Over the next five years the Planning Team will need to research and document the shift in population and its effect if any on flood events.

Land Use

Changes in land cover such as urbanization, deforestation and cultivation may result in increased flood frequency and severity. Urbanization may result in a lack of the natural environment's capacity to absorb water. Loss of vegetation and forest clearing disrupts the natural environment's process of evaporating water from both the soil and leaves of plants.

Flooding results in poor soil aeration, leading to poor plant growth. Soil becomes more acidic following a flood. In addition, flooding can lead to soil erosion or soil contamination from such man-made pollutants as oils (on roadways), fertilizers (in yards and farms) and paints.

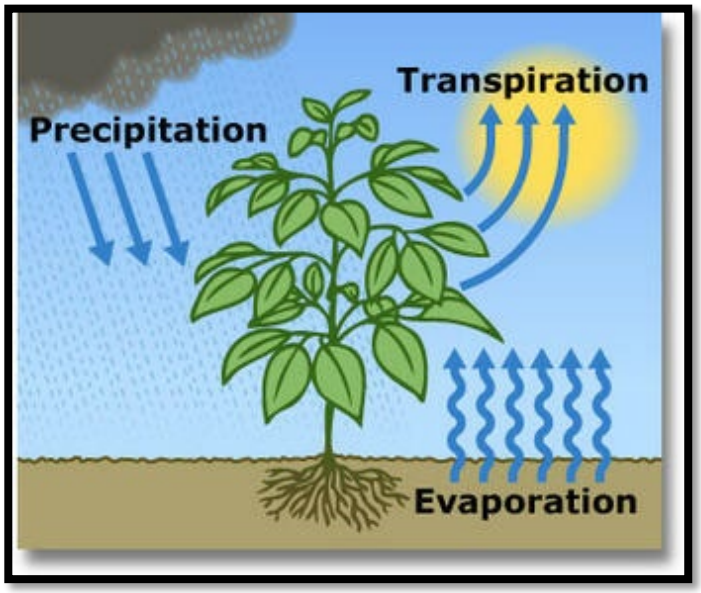
Flooding can severely stress or even kill trees, depending on how deeply or how long they remain submerged. Floods kill trees that are completely covered by water and seedlings pushed over by

the force of the water or buried under silt. Prolonged flooding can cause root rot, leading to tree death. Prior tree health plays a role in whether the trees survive after flooding.

Currently there is no documented research for the Planning Area on land use and its effect on flood events. Over the next five years the Planning Team will need to conduct and document research on the effects of land use and flood events in the Planning Area.

Climate

Climate change may have an impact on flooding. Changes in temperatures impact the frequency and severity of flood events. Warmer temperatures could cause increased amounts of precipitation. The Planning Area is currently trending both higher temperatures and more days each year of extreme heat. These warmer temperatures, in addition to population distribution and land use, affect the amounts of water evaporating from the land. This process called evapotranspiration, impacts atmospheric temperature changes. Higher rates of evapotranspiration can have a cooling effect on the land's surface and aid the natural environments ability to filter water.



https://www.usgs.gov/special-topics/water-science-school/science/evapotranspiration-and-water-cycle

The Planning Area does not have any documented research on climate change and its effects on flooding. Over the next five years the Planning Team will need to research and document climate changes and the effect it has on frequency and size of flood events.

4.8.6 Landslide

"Landslide" is used to describe the downward and outward movement of slope-forming materials reacting under the force of gravity. Landslides are classified by type of movement and type of materials. The types of movement are:

- Slides of soil or rock involve downward displacement along one or more failure surfaces. The material from the slide may be broken into several pieces or remain a single, intact mass.
- Flows are characterized by shear distributed throughout the mass of material.
- Lateral Spreads are large elements of distributed, lateral displacement of materials characterize lateral spreads.
- Falls and topples occur when masses of rock or other material detach from a steep slope or cliff, and descend by free fall, rolling, or bouncing.
-

Extent, Magnitude or Severity of Landslide:

Landslide movement is measuring using an extensometer. This is an instrument that can detect movement of the ground surface between stable ground and sliding ground. Mapping and observations are other ways of detecting landslide activity.

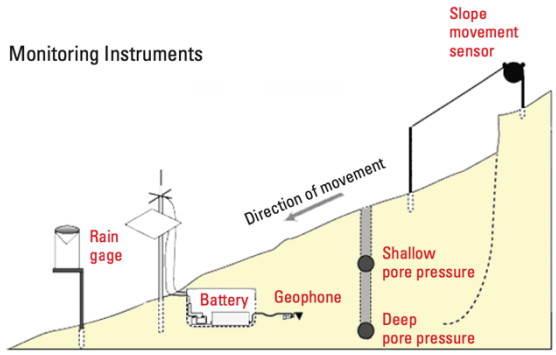
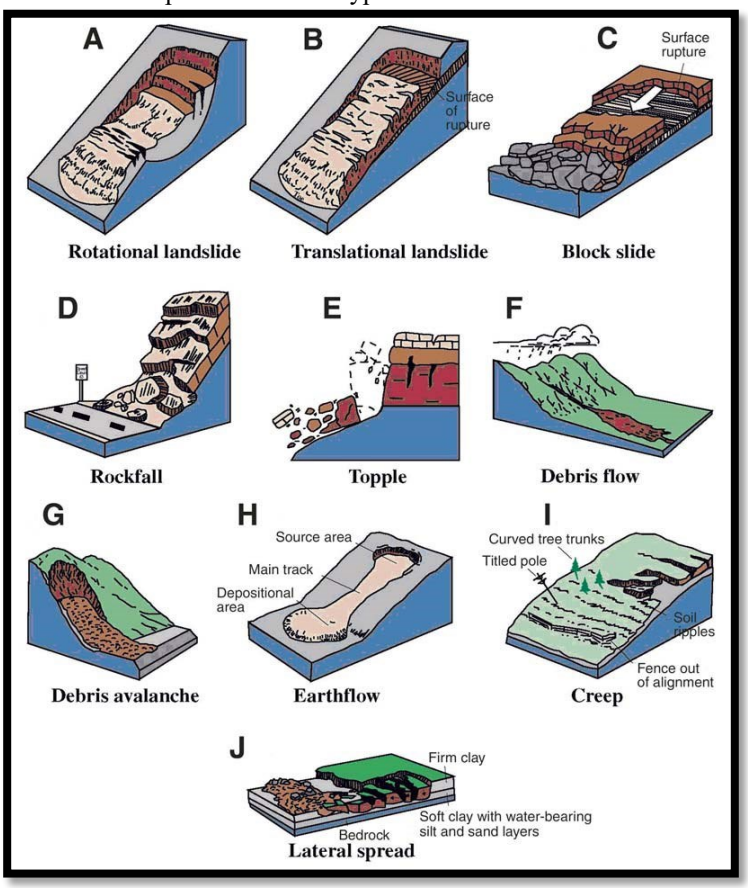


Figure B10. Example of a network for measurement and transmission of real-time landslide data. (Schematic from U.S. Geological Survey.)

As can be seen in the figure below, slope movement can occur in multiple ways. They typically start on steep hillsides. Landslides may occur with or without warning and travel up to 35 mph. Historically, landslides have been responsible for moving up to 1,000 tons of rock, dirt, and debris.

Examples of different types of landslide movement



(modified from Cruden and Varnes, 1996)

Location of Landslide Events

Arkansas Highway 369, just south of the Ouachita National Forest, can expect a rock fall, topple, or slide and would occur unexpectedly in a matter of seconds with no warning time.

Previous Occurrences

One (1) landslide event was reported between 11/01/2000 and 11/30/2023.

Number of County/Zone areas affected:	1
Number of Days with Event:	1
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	1
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	25.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	06/11/2010	02:00	CST-6	Debris Flow		0	0	25.00K	0.00K
Totals:								0	0	25.00K	0.00K

NCDC NOAA Storm Events

Probability of Future Landslides

The probability for a flood event occurring in the Planning Area in any given year is less than one percent. The probability for a flood event was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

Vulnerability and Impact of Landslides

Based on historical records, the Planning Area has seen a landslide once within the years of 2000-2023. There is little information regarding any landslide information within the Planning Area; however, this does not mean landslides would be impossible to occur in Montgomery County. If a landslide event occurred on a State Highway, truckloads of mud, topsoil, and fallen trees would impede travel. Individuals caught on a highway would be exposed to the possibility of vehicular accidents resulting in fatalities or injuries. Damages to property and crops are both possible effects from landslide events.

The Cities of Black Springs, Mount Ida, Norman and Oden and the school district campuses of Caddo Hills and Mount Ida could be affected by landslides.

The most vulnerable populations will be those who are unable to move out of harm's way due to disability, age, or poverty levels. Since landslides typically happen suddenly and without notice, these are the populations most likely to have inadequate abilities and resources.

Population

Population density influences both the natural landscape and climate.

As people build, they remove rock, dirt, trees, and grass. They build structures for homes, businesses, and infrastructure. Areas that were once full of trees become prime real estate or farmland to meet increased food demands. These changes in structure, weight and landscape alter the vulnerability and impact of a landslide. The human-made changes in topography and vegetation impact the earth's natural balance. Cutting roads, building retaining walls, adding concrete, or clearing vegetation for farmland may weaken slopes. According to research by the American Geophysical Union in 2021, urban areas are at a greater risk for precipitation-triggered landslides than rural areas.

Land Use

As population dynamics and climate patterns undergo transformation, their combined impact and associated vulnerabilities also evolve. A growing population necessitates the construction of additional infrastructure, thereby heightening the likelihood of resource depletion, property damage, and loss of life in the face of adverse events. The shifting demographic and climatic landscape highlight the need for comprehensive analysis by the planning team.

Climate

Currently, the Planning Area lacks documented research concerning the effects of population, land use, and climate change, on landslide events. These impacts will be monitored by the planning team over the next 5 years to continue research for nature-based solutions to mitigate all possibilities of potential increased impact.

4.8.7 Thunderstorm

Thunderstorms are formed from a combination of moisture, rapidly rising warm air and a force capable of lifting air such as a warm or cold fronts.

Thunderstorms can bring heavy rains, strong winds, hail, lightning, and tornadoes.

Lightning is an electrical discharge resulting from the buildup of positive and negative charges within a thunderstorm.

Hail - Hail is a form of precipitation occurring when updrafts in thunderstorms carry raindrops upward into extremely cold areas of the atmosphere where they freeze into balls of ice. Hail can damage aircraft, homes, and cars, and can be deadly to livestock and people.

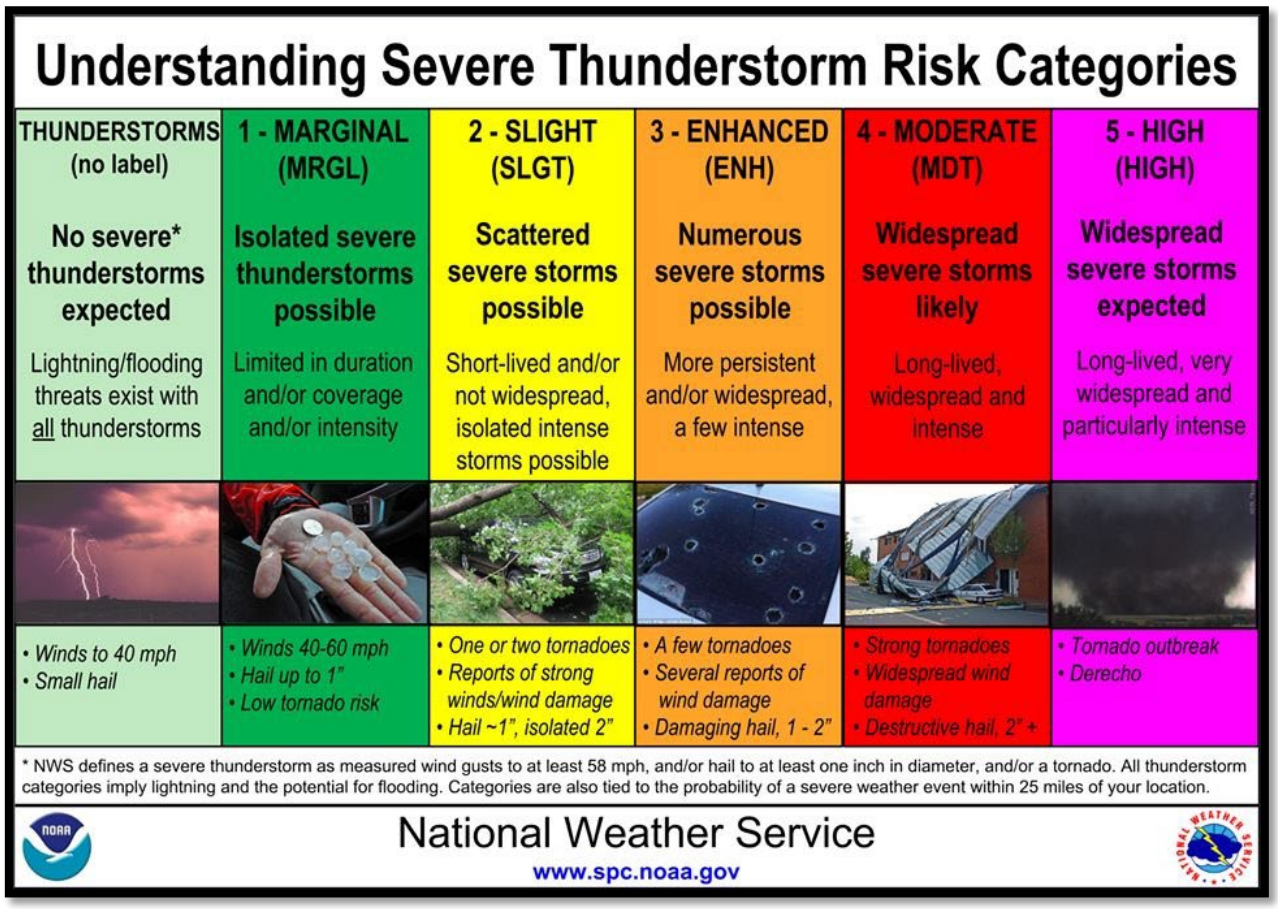
Strong Winds - also referred to as straight-line wind, is any wind that is not associated with rotation. This term is used mainly to differentiate thunderstorm winds from tornado winds. High winds originate as a downdraft of rain-cooled air, which reaches the ground and spreads out rapidly. This can produce a potentially damaging gust of wind up to and sometimes over 100 mph. In recent years, there have been several occasions in Arkansas where winds greater than 100 mph have been measured. Winds of 58 mph (50 knots) or more are considered severe. The horizontal component of near-surface wind phenomena is the most significant aspect of the hazard.

Extent, Magnitude, or Severity

All plan participants experience thunderstorms, lightning, strong winds and hail events. All parts of the planning area are equally subject to thunderstorms ranging from marginal to high risk.

Location of Thunderstorm, Lightning, Strong Winds, and Hail Events

Thunderstorm, lightning, strong winds and hail events do not have any geographical boundaries in the Planning Area. The entire planning area is capable of experiencing thunderstorm, lightning, strong winds and hail events.



Damage from severe thunderstorm winds account for half of all severe reports in the lower 48 states and is more common than damage from tornadoes. Wind speeds can reach up to 100 mph and can produce a damage path extending for hundreds of miles.

Previous Occurrences

Event	Events	Fatalities	Injuries	Property Damage/Crop Damage	Total Loss
Thunderstorm winds	158	0	0	39	$2,043,000.00
Strong Winds	7	0	0	7	$430,000.00
Lightning	7	0	0	5	$288,500.00
Hail Events	93	0	0	N/A	N/A

NCDC NOAA Storm Events

There has been a total of 265 events over the last 23 years. There have been no reported injuries for thunderstorm, strong winds, lightning and hail events.

On October 2, 2014, the city of Gurdon experienced severe thunderstorms causing $50,000.00 in property damage. Damage ranged from a few missing shingles to being destroyed by fallen trees. Gusty cold winds mixed with Arkansas' hot and humid climate. Numerous trees and power lines were blown down. State Highways 67, 51, and 53 had trees impeding the way of travel.

July 22, 2008, in Joan, a severe thunderstorm moved through the east side of Arkadelphia. Lightning struck a young pine plantation off Round Hill Road. Approximately 100 acres of pine

trees burned due to the strike. Timber plantations are important to the economics of Clark County. Damage from this storm resulted in $200,000.00.

The largest amount of property damage has been the result of thunderstorm winds.

June 14, 2023, in Degray, Clark County, thunderstorm winds created four-inch diameter hail. This is equivalent to baseball and softball sizes. The hail caused severe property damage. Houses had roof damage and stripped roofing shingles. Vehicles exposed to the hail suffered broken windshields, shattered glass both inside and outside which required major repairs. During the storm, low visibility down to a half mile was reported throughout the Planning Area.

January 29, 2008, Clark County experienced strong straight-lined winds across the entire Planning Area. Wind speeds were recorded at 30-40 mph while wind gusts were measured at 50 mph. Trees and power lines were down, causing 80,000 residents to go without power. Arkadelphia Town Hall's south-facing doors was damaged. Unity Road and Shiloh Road were blocked by fallen trees on the road: on Vaden Road, a power line fell across the road. Damage from this storm resulted in $250,000.00.

Probability of Future Occurrences

The probability for a thunderstorm, strong wind, lightening, or hail event occurring in the Planning Area in any given year is less than one percent. The probability for a flood event was estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

Climate change may increase the probability and strength of thunderstorms and associated hazards. These impacts will be monitored by the planning team over the next 5 years to continue to research nature-based solutions to mitigate all possibilities of potential increased impact.

Vulnerability and Impact for Thunderstorm Events

The threat of thunderstorms, strong winds, lightning and hailstorms effect all the participating jurisdictions: cities of Black Springs, Mount Ida, Norman, and Oden and the school districts of Caddo Hills, Mount Ida, can experience thunderstorms. In all participating jurisdictions, and unincorporated areas of Montgomery County, structures and their contents are vulnerable to damage by thunderstorms winds. Strong winds can down trees onto power lines, damage mobile homes that are not anchored, and rip off roofing. Winds can cause death and injuries by lifting unanchored objects. Lightning strikes can cause structural, timberland, and grass fires. It can cause damage to the communication towers throughout the jurisdictions and disrupt service. Hailstorms could cause damage to all structures, mainly roof shingles which can lead to roof leaks and further damage to the structure interiors. All types of real estate and personal property are vulnerable to hail: cars, trailers, boats, and crops. Hailstorms can cause bodily injury if caught outside without protection.

Unincorporated areas of Montgomery County:

Many homes may be damaged or destroyed during severe storm events due to the materials used in their construction. Those living in structures built of unreinforced masonry or homes without a safe room are at higher risk of injury or death during thunderstorms, this is especially true for the elderly and the young. Travelers and those camping, without a substantial shelter or safe room nearby, are extremely vulnerable to injury or death. Many rural farm's infrastructure and livestock may be vulnerable to damage or loss during severe weather events. Crops and timberland are at risk from lightning strikes. These strikes may cause injuries or start fires that can destroy infrastructure and/or crops or other field grown products.

The City of Black Springs:

In the city of Black Springs, commercial and residential structures throughout the city may be susceptible to destruction or damage during a severe weather event due to the materials used in their construction. There are no major health facilities located in the City of Black Springs. There are other critical facilities in the city of Black Springs that could receive major damage that would impede their abilities to respond and provide support during a thunderstorm event. These would include the 911 Dispatch Center and the Black Springs Fire Department.

The City of Mount Ida:

In the city of Mount Ida, commercial and residential structures throughout the city may be susceptible to destruction or damage during a severe weather event due to the materials used in their construction. There is one major health facility located in the City of Mount Ida: Baptist Health. Damages to the power grid feeding this facility may cause a loss of services during a severe weather event. Patient care may be delayed until power systems are restored. There are other critical facilities in the city of Mount Ida that could receive major damage that would impede their abilities to respond and provide support during a thunderstorm event. These would include the Mount Ida City Hall, Mount Ida Police Department, Mount Ida Fire Department, Mount Ida Wastewater Treatment Plant and Mount Ida Water Department. There are no public saferooms or shelters located in the City of Mount Ida.

The City of Norman:

In the city of Norman, commercial and residential structures throughout the city may be susceptible to destruction or damage during a severe weather event due to the materials used in their construction. There are no major health facilities located in the City of Norman but there are other critical facilities in the city of Norman that could receive major damage that would impede their abilities to respond and provide support during a thunderstorm event. These would include the Norman Police Department and Norman Fire Department. The City of Norman is located near Arkadelphia on the Ouachita River. There are no public saferooms or shelters located in the City of Norman.

The City of Oden:

In the city of Oden, commercial and residential structures throughout the city may be susceptible to destruction or damage during a severe weather event due to the materials used in their construction. There are no major health facilities located in the City of Oden. There are other critical facilities in

the city of Oden that could receive major damage that would impede their abilities to respond and provide support during a thunderstorm event. These would include the Oden City Hall, Oden Police Department, Oden Wastewater Treatment Plant, and Oden Water. There are no public saferooms or shelters located in the City of Oden.

Caddo Hills School District:

The buildings on campus may be susceptible to the effects of a thunderstorm. Buildings could be damaged or destroyed during a severe storm event. Losses could also include the contents such as computers, gym equipment, desks, chairs, and records. There is a saferoom located on campus to provide safety to the students and staff during school hours. This saferoom is available to those living nearby outside of school hours. This helps reduce the risk to those on or near campus during a severe weather event.

Mount Ida School District:

The buildings on campus may be susceptible to the effects of a thunderstorm. Buildings could be damaged or destroyed during a severe storm event. Losses could also include the contents such as computers, gym equipment, desks, chairs, and records. There is a saferoom located on campus to provide safety to the students and staff during school hours. This helps reduce the risk to those on campus during a severe weather event.

Population changes in the Planning Area and its effect on thunderstorm events are unknown. However, changes in population demographics could potentially increase the need for mitigation in the Planning Area due to thunderstorm events. Over the next five years the Planning Team will need to monitor and document an increase/decrease in population as well as track demographics to see if there is a rise or decline in vulnerable populations.

Land use changes can have an impact on atmospheric temperatures. Urbanization creates higher air temperatures compared to the surrounding rural areas. The Planning Area is expecting an increase in industry over the next five years. The Planning Team will need to monitor and document land use changes to see if they correlate with an increase/decrease in thunderstorm events over the next five years.

Climate change may increase the probability and strength of thunderstorms and associated hazards. These impacts will be monitored by the planning team over the next 5 years to continue to research nature-based solutions to mitigate all possibilities of potential increased impact.

4.8.8 Tornado

A tornado is a rapidly rotating vortex or funnel of air extending groundward from a cumulonimbus cloud.

Tornado damage severity is measured by the Enhanced Fujita Scale. The Enhanced Fujita Scale assigns numerical values based on wind speeds and categorizes tornadoes from EF-0 to EF-5. Scale values above EF-5 are not used because wind speeds above 318 mph (513km/h) are unlikely.

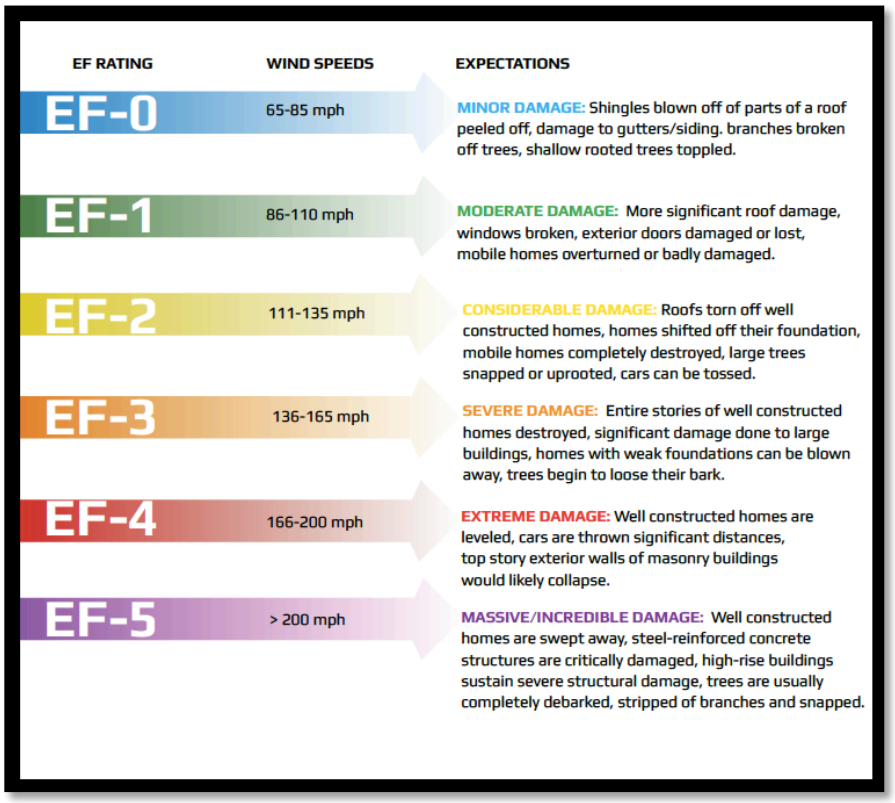
Locations of Tornado Events

There are no defined geographic hazard boundaries. All people and property in the planning area are exposed to the risk of a tornado event.

Extent, Magnitude, or Severity of Tornado

The entire Planning Area is exposed to the risk of a tornado event any time of the year. The Planning Area could have a tornado ranging from EF-0 to an EF-5 causing minor to massive damage.

Enhanced Fujita Scale



https://www.weather.gov/oun/efscale

Previous Occurrences

There have been 11 tornado events reported between 01/01/2000 and 12/31/2023. There are 2 recorded injuries, $625,000 in property damage and $0 in lost crops.

Number of County/Zone areas affected:	1
Number of Days with Event:	7
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	1
Number of Days with Event and Property Damage:	3
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	2	625.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	05/01/2003	20:09	CST	Tornado	F2	0	0	0.00K	0.00K
BLACK SPGS	MONTGOMERY CO.	AR	04/09/2004	19:37	CST	Tornado	F0	0	0	0.00K	0.00K
WELSH	MONTGOMERY CO.	AR	11/27/2005	16:42	CST	Tornado	F1	0	0	0.00K	0.00K
WELSH	MONTGOMERY CO.	AR	11/27/2005	16:49	CST	Tornado	F1	0	0	0.00K	0.00K
PINE RIDGE	MONTGOMERY CO.	AR	04/25/2011	14:00	CST-6	Tornado	EF1	0	0	50.00K	0.00K
WELSH	MONTGOMERY CO.	AR	04/25/2011	15:43	CST-6	Tornado	EF1	0	0	100.00K	0.00K
HUDDLESTON	MONTGOMERY CO.	AR	05/30/2013	14:00	CST-6	Tornado	EF2	0	2	250.00K	0.00K
WELSH	MONTGOMERY CO.	AR	05/30/2013	14:27	CST-6	Tornado	EF1	0	0	10.00K	0.00K
COX SPGS	MONTGOMERY CO.	AR	05/30/2013	17:10	CST-6	Tornado	EF1	0	0	15.00K	0.00K
JOPLIN	MONTGOMERY CO.	AR	03/13/2016	15:48	CST-6	Tornado	EF1	0	0	200.00K	0.00K
ODEN	MONTGOMERY CO.	AR	04/13/2018	18:51	CST-6	Tornado	EF0	0	0	0.00K	0.00K
Totals:								0	2	625.00K	0.00K

NOAA Storm Events - Montgomery County

A strong cold front pushed into Arkansas on the April 25, 2011. Severe thunderstorms erupted along and ahead of the cold front. Numerous instances of wind damage occurred, especially in the southern half of the state. An EF1 tornado occurred in Montgomery County. Numerous trees were knocked down, along with some powerlines. The community experienced $50,000 worth of property damage altogether.

On the same day mentioned above, April 25, 2011, another EF1 tornado blew into Montgomery County, west-northwest of Elm and entered east-southeast of Welsh. This is the second segment of a four-segment tornado. This tornado caused $100,000.00 in property damage. Many trees were uprooted or snapped off; one of the trees fell on a house. Power lines and poles were scattered across the county. These tornadoes were both included in storm systems that are better known as the ‘Great Flood of 2011.’

The Planning Area has seen stronger tornadoes within its perimeters. On May 30, 2023, an EF2 tornado event took the roof off a residential home. Outbuildings and other properties were either destroyed or damaged. Trees across the Area were uprooted or snapped in half. This tornado event left two individuals injured in the aftermath. Property damage from this event caused approximately $250,000.00 in damage.

A smaller tornado ripped through the Planning Area on March 13, 2016. While wind gusts were not as strong, significant damage was seen at the houseboat marina, Mountain Harbor Resort.

Trees, power lines and poles alike were thrown about. Homes in several locations suffered substantial damage, including a mobile home. Property damage from this event caused approximately $200,000.00 in damage.

Probability of Future Occurrences

There is less than one percent chance of a tornado occurring in any given year. Probability is estimated using the following equation:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

Vulnerability and Impact of Tornado

The Planning Area is located in "Tornado Alley", the most tornado prone area of the nation.

Because there is no defined geographic hazard boundary, all areas, residents, structures, and critical facilities in Planning Area are at high risk from tornado events.

People, wildlife, and livestock in the Planning Area, are all vulnerable to tornados and airborne objects. Fatalities can occur with a tornado event. Those that are most vulnerable are children under the age of 5, older adults over the age of 65, those with disabilities, those suffering from economic hardship and the unhoused. Even with advances in meteorology, tornado warning times may be issued in a short period of time.

All infrastructure in the Planning Area is vulnerable to a tornado event. This includes energy, gas, communication, and transportation. Electrical wires and communication towers are the most vulnerable to tornados. Downed power lines combined with other debris from the tornado can cause delay in travel, injury, or death. Power and water outages would cause food spoilage and sanitation problems for communities, increasing the chance of disease. Power outages and water outages during seasonal heat or cold could contribute to fatalities.

All critical facilities in the Planning Area are vulnerable to a tornado event. This includes nursing homes, clinics, hospitals, day care centers, and schools. At least one of these facilities is located in every part of the Planning Area. These facilities house a large portion of the Planning Areas most vulnerable populations. Infrastructure and utility outages caused by a tornado event could prevent staff and emergency workers from working. Supply shipments may be interrupted leaving people without basic necessities and medications. Schools may be forced to close for a short term or longer.

All businesses in the Planning Area are vulnerable to a tornado event. Businesses could receive minor to major damage or be completely destroyed. Damage or destruction of a business could lead to economic hardship for individual business owners, economic damage to the Planning Area, or hazardous waste/contamination.

All residences in the Planning area are vulnerable to a tornado event. Residential structures may receive mild damage or be completely destroyed. Damage to residential structures could cause a significant number of people to be without shelter or living in unsafe conditions.

The natural environment is vulnerable to a tornado event. Trees may be ripped out of the ground clearing large areas of forest. Change to the natural landscape could have a cascading effect on the Planning Area.

The structures most vulnerable to tornadoes are wood frame structures and manufactured homes. Damage to residential structures could cause hundreds to be without shelter leaving them with no place to live.

According to the US Census Bureau there are a total of 5,482 housing structures in the Planning Area.

The unincorporated areas of Montgomery County, cities of Black Springs, Mount Ida, Norman, Oden, and the school districts of Caddo Hills, Mount Ida, and Ouachita River School District – Oden Campus would be affected due to the loss of power, water, sewer, gas, and communications. Power and water outages would cause food spoilage and sanitation problems for communities. Hospitals, grocery stores and other critical need and economically important facilities are damaged and closed for extended periods.

Vulnerable populations (retirement homes, schools, and childcare centers) are located in about every section of the county. Long term care facilities/Nursing Homes are located in Mount Ida. The Caddo Hills, Mount Ida, and Ouachita River School Districts – Oden Campus could be closed for extended periods due to power and water outages, or possible damage to building structures on school campuses. The school buses are also disrupted due to damaged or destroyed roads and bridges. Employment would be affected from school closings.

Population

The Planning Area is currently experiencing one of the largest annual population increases (years 2020 and 2021)(Montgomery County, AR population by year, race, & more | USAFacts). As population rises and cities become denser the impact of tornados changes. It is not the frequency of tornadoes that changes due to population changes. It is the level of damage that can result due to higher populations, structures, automobiles, and other objects that can be thrown around damaging property and injuring/killing people. The most vulnerable population in the planning area will be those who are unable to take adequate shelter due to disability, age, or poverty levels. These impacts will be monitored by the planning team over the next 5 years to continue research for nature-based solutions to mitigate all possibilities of potential increased impact.

Land Use

The Planning Area does not currently have any documented research on how land use in the Planning Area would affect tornado events. The Planning Area is currently experiencing one of the largest annual population increases (years 2020 and 2021)(Montgomery County, AR population by year, race, & more | USAFacts). This factor will change natural environment and land use patterns. These impacts will be monitored by the planning team over the next 5 years to

continue research for nature-based solutions to mitigate all possibilities of potential increased impact.

Climate

Climate change caused by population growth, burning of fossil fuels, release of carbon dioxide in larger amounts has an impact on global warming. Global warming is attributed to drought in some places and higher levels of rainfall in others. However, nationalgeographic.org states that weather events such as tornadoes are much harder for climatologists to attribute to climate change. As of right now the data does not support any long-term increase in tornado frequency.

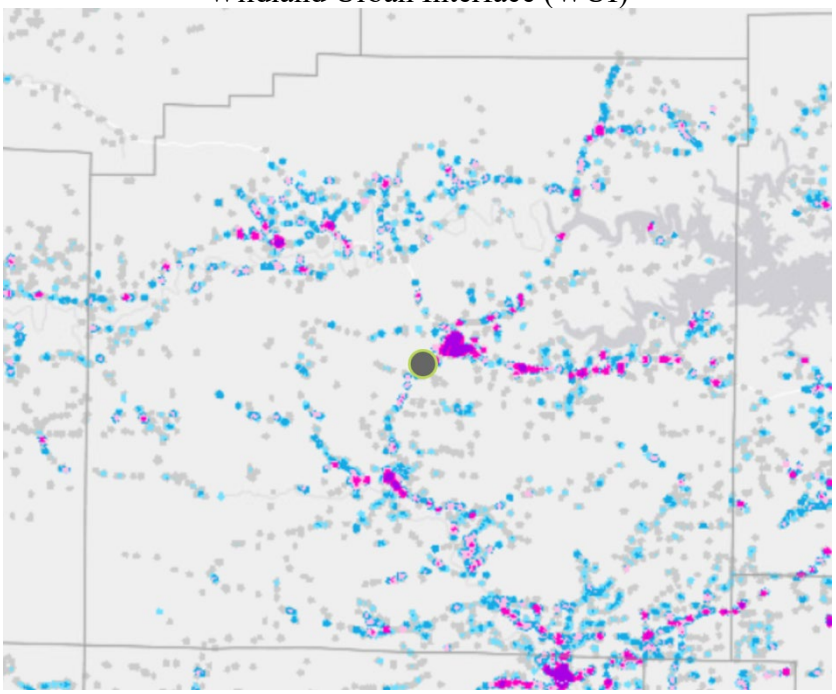
4.8.9 Wildfire

A wildfire is an unplanned, unwanted fire burning in a natural area, such as a forest, grassland, or prairie. Wildfires can start from natural causes, such as lightning, but most are caused by humans, either accidentally or intentionally. Wildfires can damage natural resources, destroy homes, and threaten human lives and safety. (FEMA)

Locations Affected by Wildfires

According to the Southern Group of State Foresters, the Wildland Urban Interface (WUI) provides the best assessment of wildfire risk to humans. WUI reflects housing density depicting where humans and their structures meet or intermix with wildland fuels. The darker purple indicates a higher population in proximity to burnable areas.

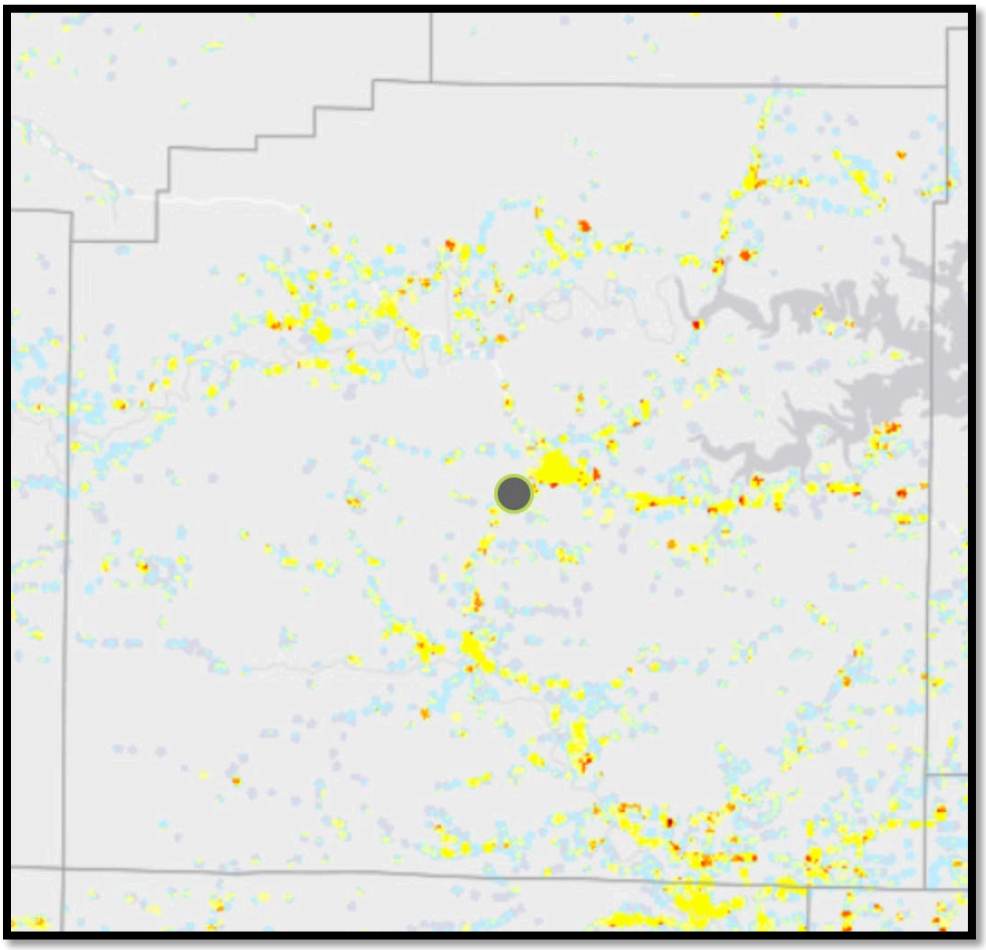
Wildland Urban Interface (WUI)



SGSF WRAP - Basic Viewer (southernwildfirerisk.com)

The WUI Risk Index visualizes the potential impact of a wildfire on people and their homes. The Risk Index is based on WUI (housing density) and the susceptibility to fire at different intensity levels, such as flame length. Areas with a high housing density and high flame length have a higher risk than areas with low housing density and low flame lengths. Locations in red determine where the greatest potential impact to homes and people is likely to occur.

WUI Risk Index GPS coordinates



SGSF Wildfire Risk Assessment Portal

Extent, Magnitude and Severity of Wildfires

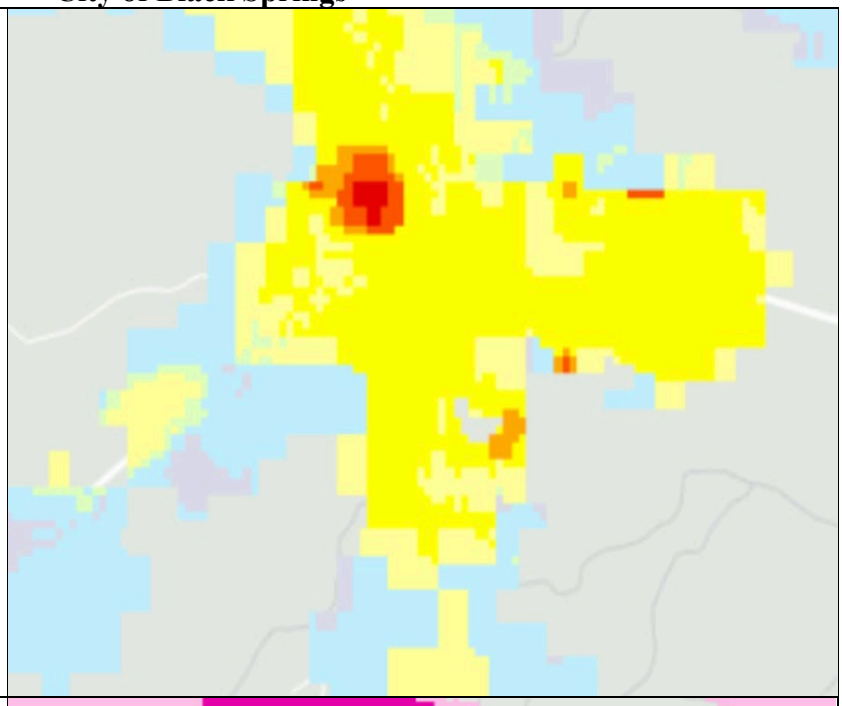
Two methods were used to analyze wildfires risk and mitigation for each plan participant. First, the WUI Risk Index was reviewed to determine the areas with the highest potential impact of a wildfire on people and their homes.

Second, Community Protection Zones (CPZs) were evaluated. CPZs are based on an analysis of the housing density data and surrounding fire behavior potential. Primary CPZs represent those areas considered highest priority for mitigation planning activities. Secondary CPZs are determined using the rate of spread data to determine buffer areas around populated areas within a 2-hour fire spread distance.

City of Black Springs

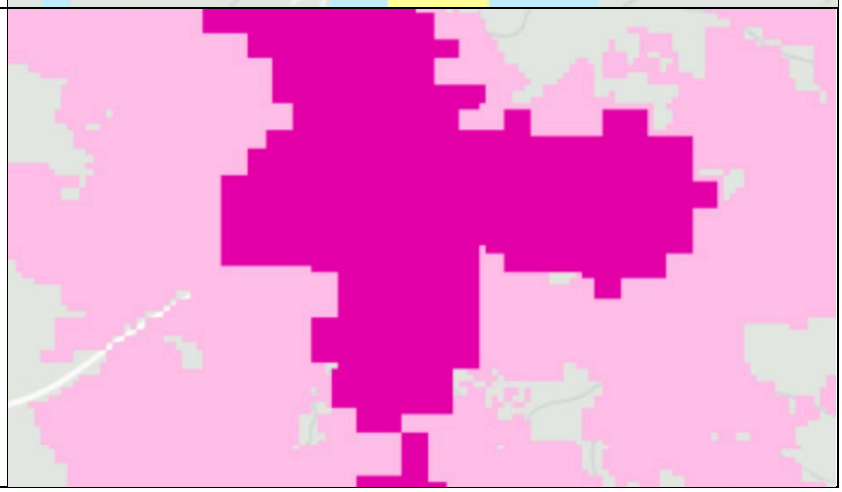
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

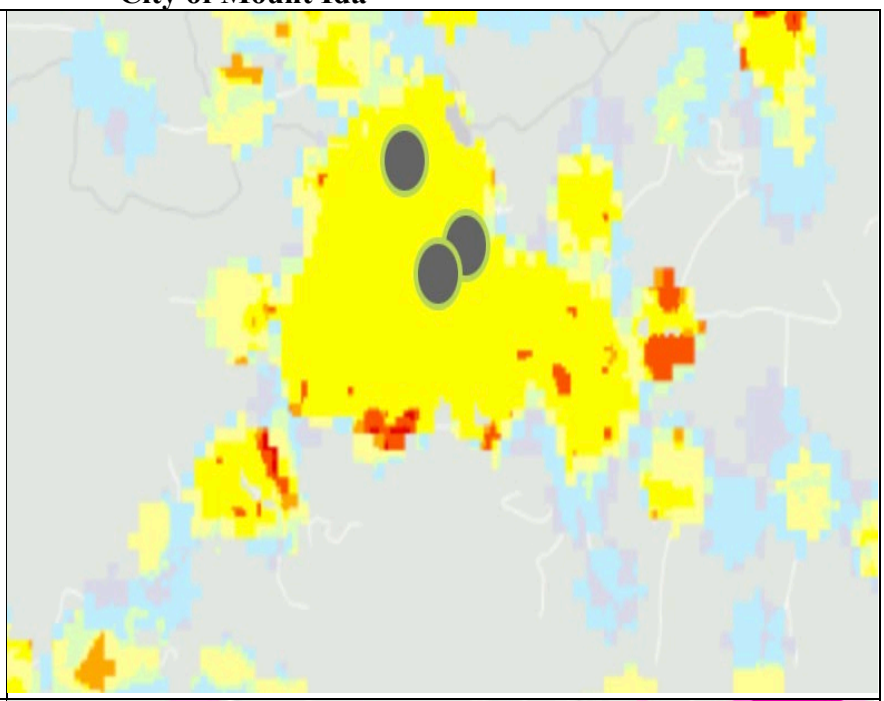
	Primary CPZs
	Secondary CPZs



City of Mount Ida

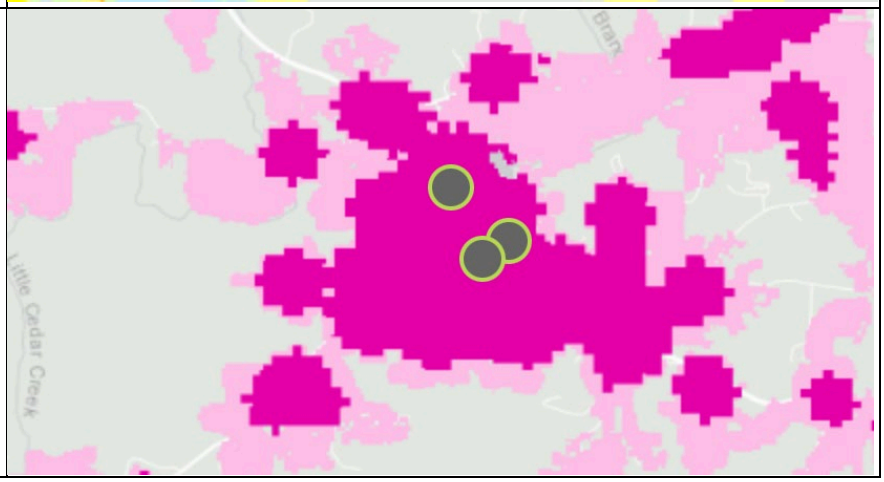
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

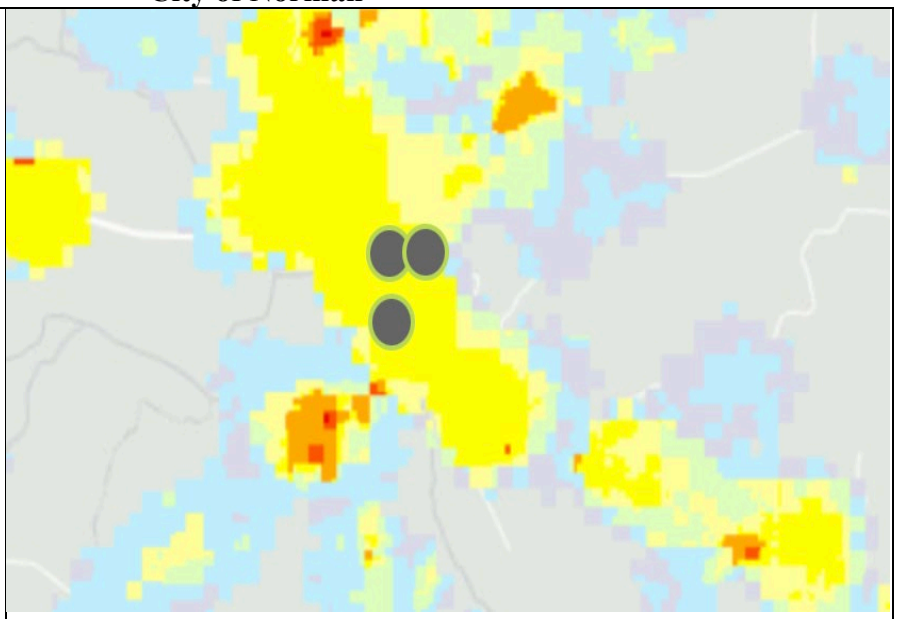
	Primary CPZs
	Secondary CPZs



City of Norman

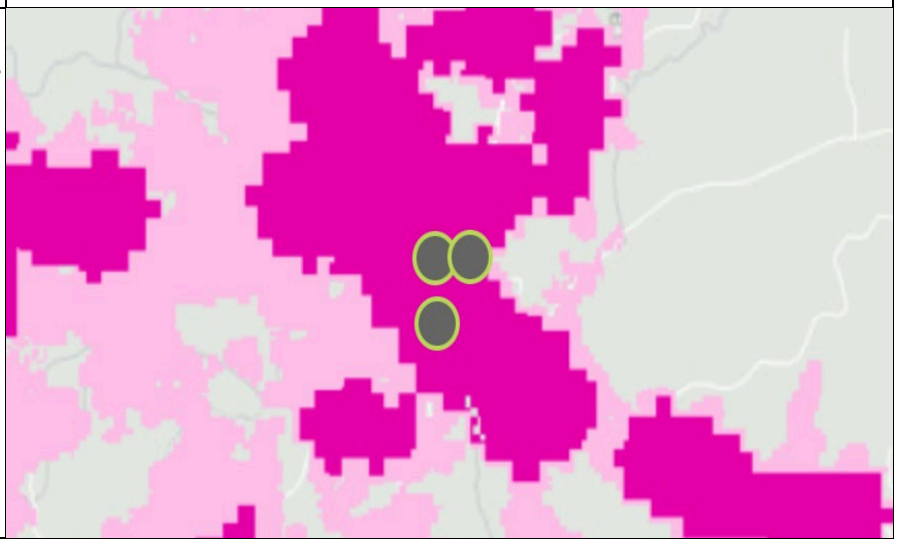
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

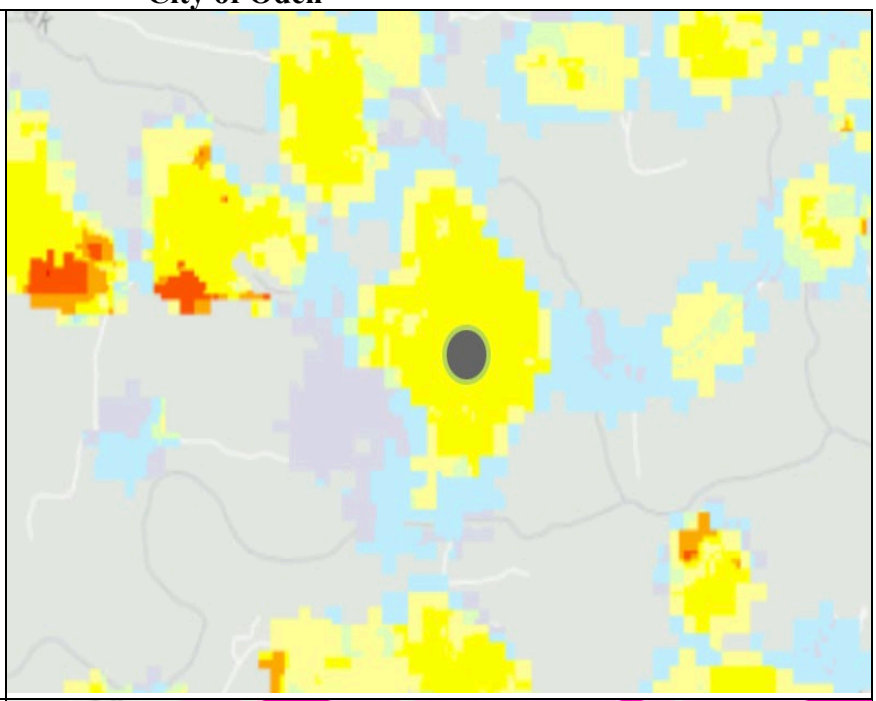
	Primary CPZs
	Secondary CPZs



City of Oden

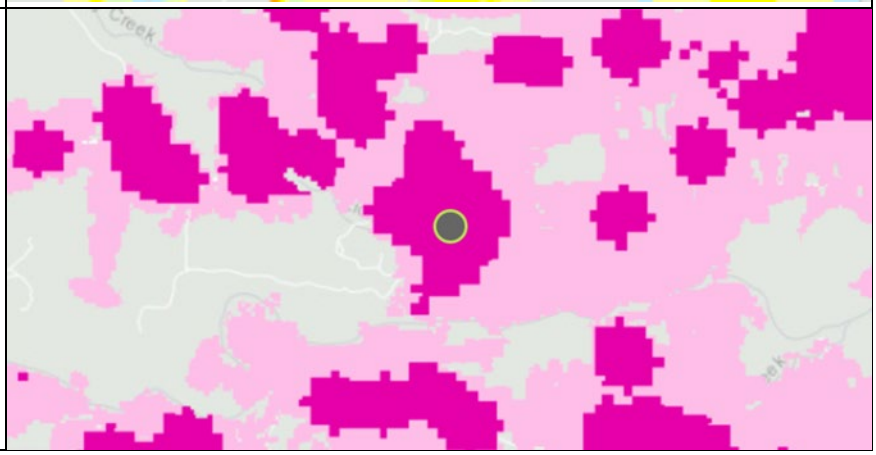
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

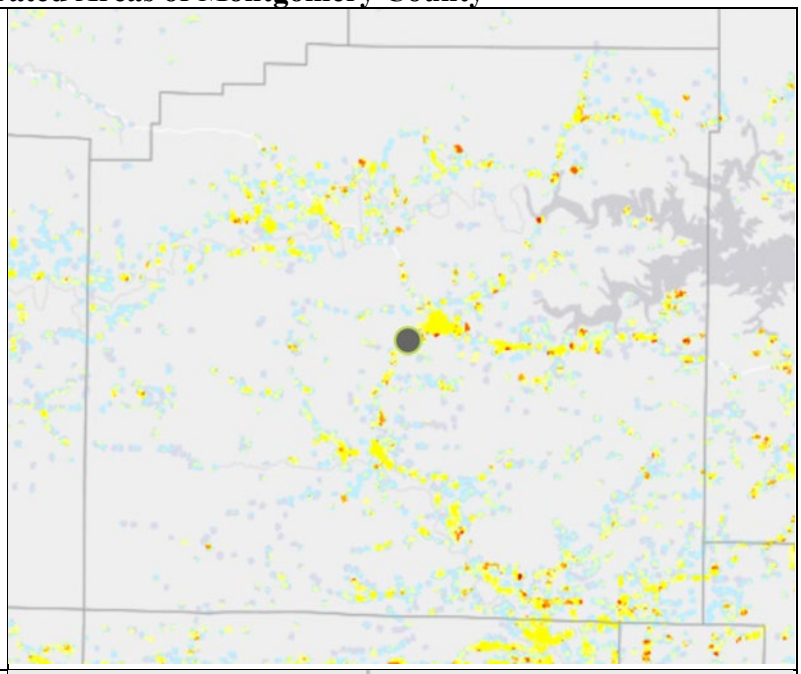
	Primary CPZs
	Secondary CPZs



Unincorporated Areas of Montgomery County

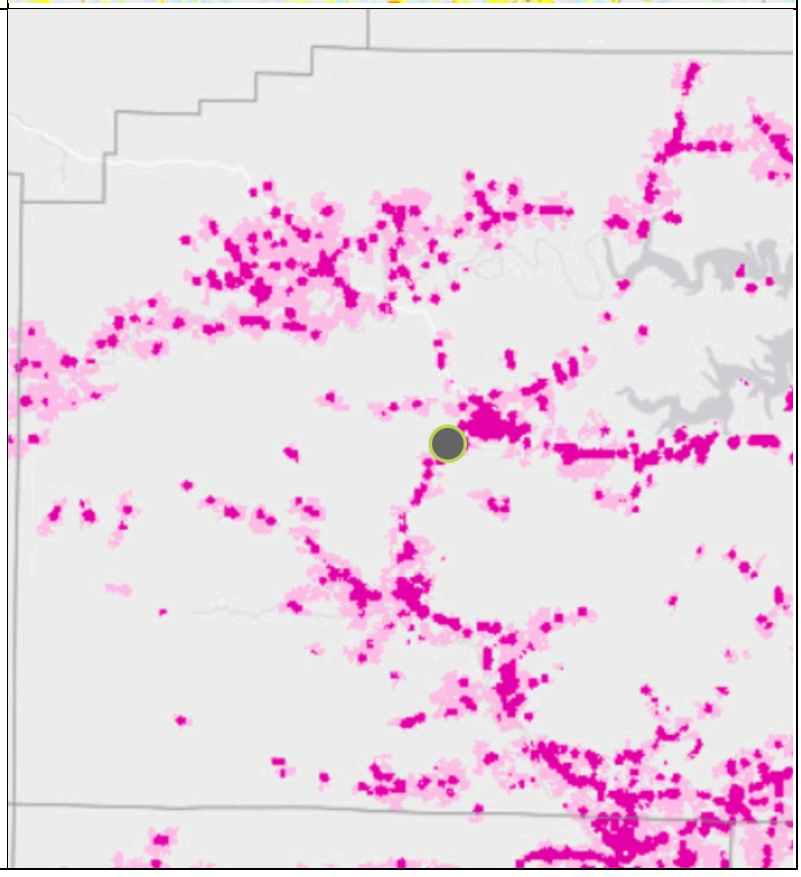
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

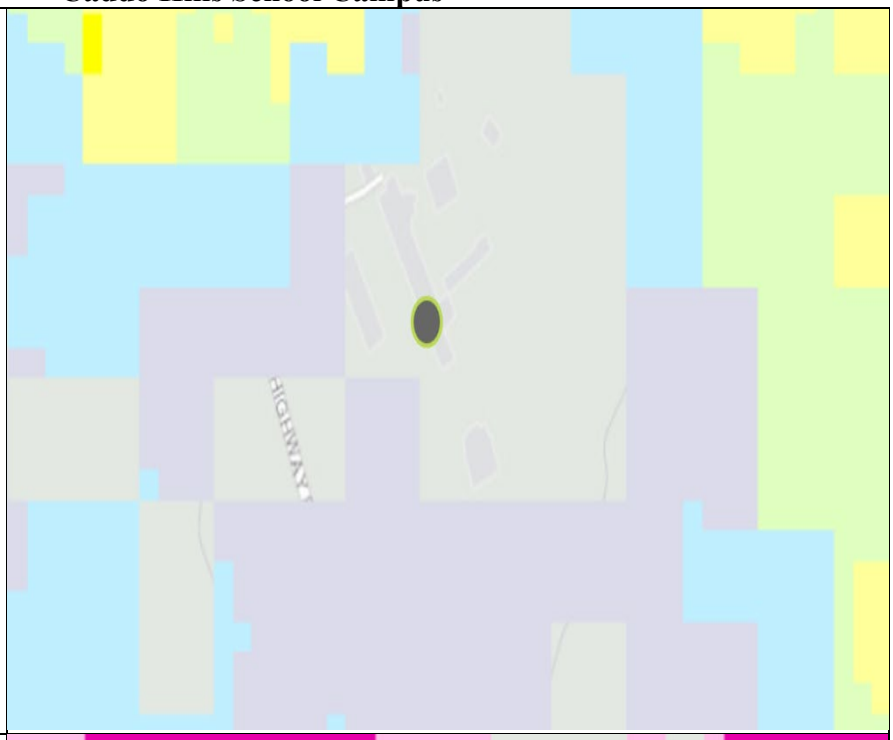
	Primary CPZs
	Secondary CPZs



Caddo Hills School Campus

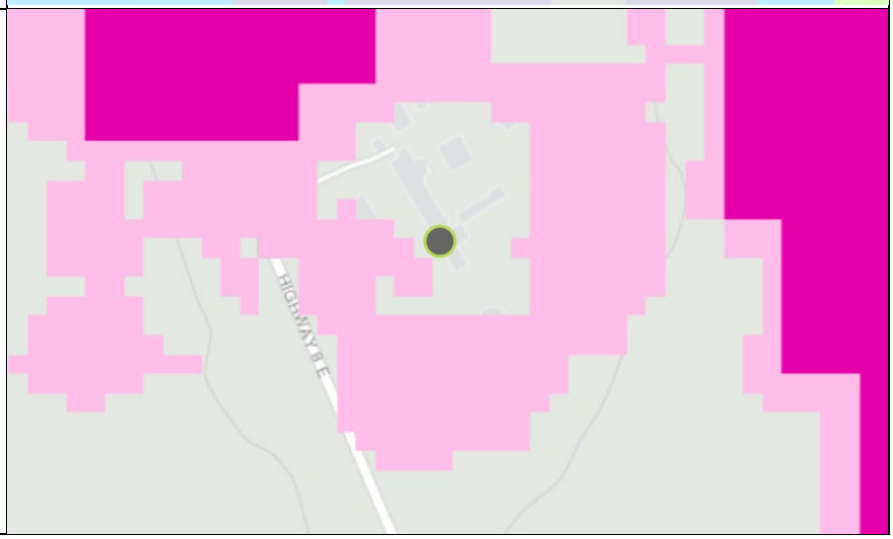
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

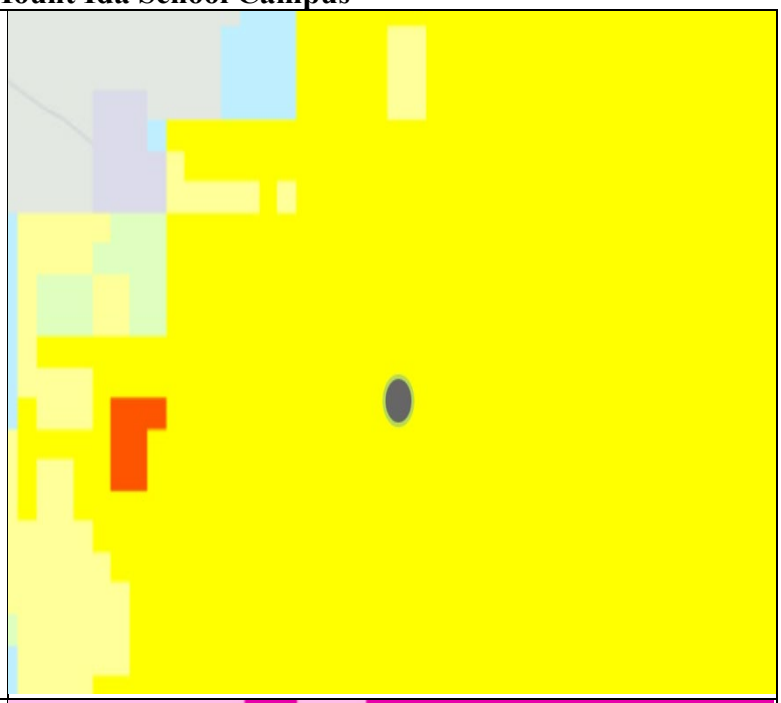
	Primary CPZs
	Secondary CPZs



Mount Ida School Campus

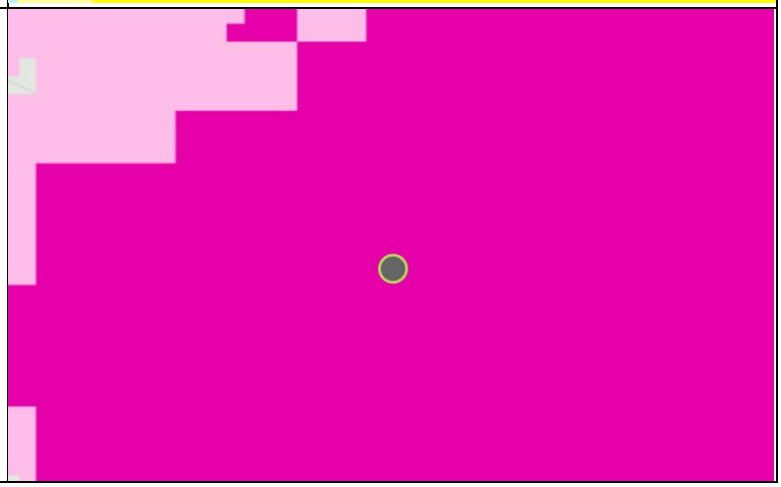
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

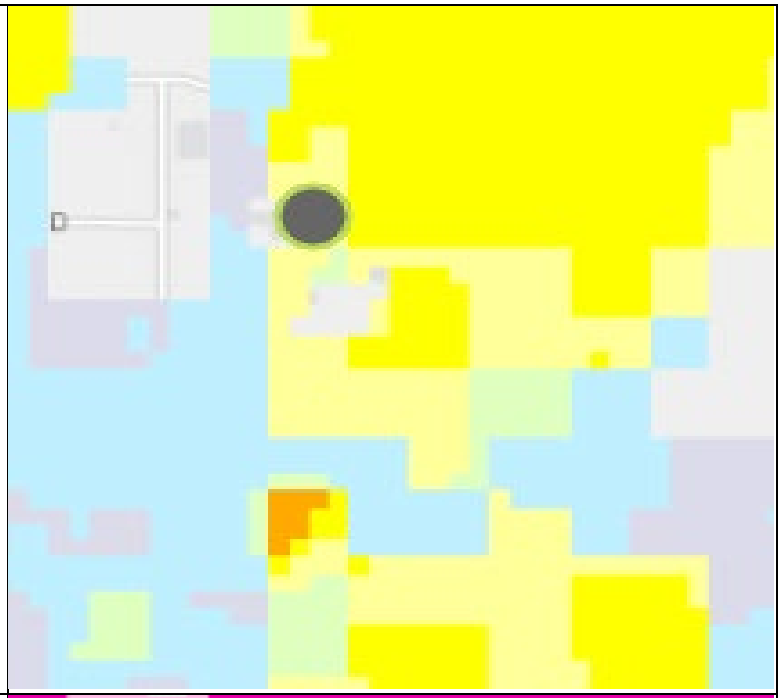
	Primary CPZs
	Secondary CPZs



Ouachita River School District

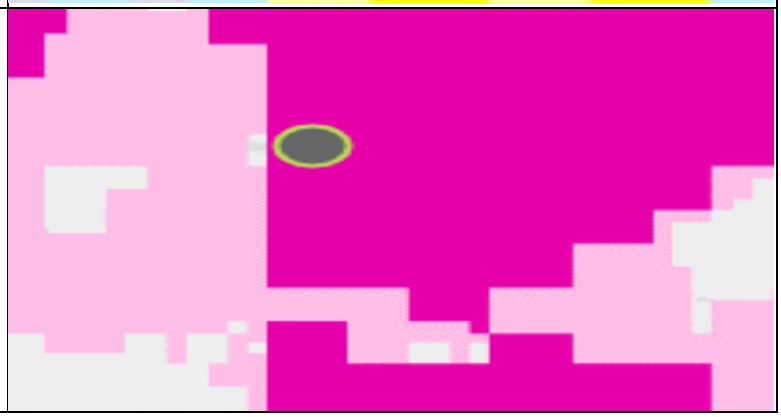
WUI Risk Index

-9	Major Impacts
-8	
-7	
-6	
-5	Moderate
-4	
-3	
-2	
-1	Minor Impacts



Community Protection Zones (CPZs)

	Primary CPZs
	Secondary CPZs



Previous Occurrences

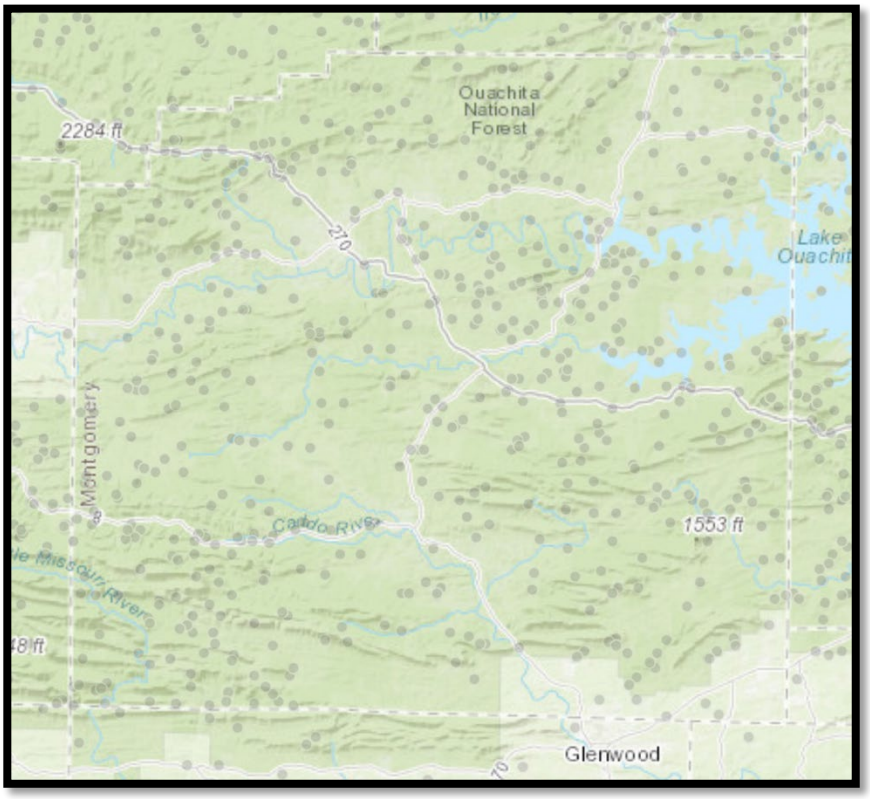
According to the National Interagency Fire Center (NIFC), there were 36 wildfires from 2020 to 2023. A total of 640 acres were burned.

Between 2013 and 2019, the Arkansas Department of Agriculture Forestry division reported 58 fires in the Planning area, which burned 271 acres.

FEMA has not declared any wildfire disasters in the Planning Area.

Year	Fires	Acres
2013	5	25
2014	5	55
2015	8	44
2016	7	107
2017	10	21
2018	9	14
2019	14	5
2020	3	63
2021	6	139
2022	20	338
2023	7	101
TOTAL	94	912

NIFC Wildland Fire Data (2020 to 2023)



National Interagency Fire Center (NIFC)

The NOAA Storms Events Database only reports three wildfires from 2000-2023. Three people were injured from wildfire in this time period.

Number of County/Zone areas affected:	1
Number of Days with Event:	7
Number of Days with Event and Death:	0
Number of Days with Event and Death or Injury:	0
Number of Days with Event and Property Damage:	0
Number of Days with Event and Crop Damage:	0
Number of Event Types reported:	1

Location	County/Zone	St.	Date	Time	T.Z.	Type	Mag	Dth	Inj	PrD	CrD
Totals:								0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	03/14/2006	04:00	CST	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	07/29/2011	13:30	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	08/01/2011	00:00	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	08/20/2011	13:00	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	09/01/2011	00:00	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	09/14/2011	13:00	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	09/14/2011	13:00	CST-6	Wildfire		0	0	0.00K	0.00K
MONTGOMERY (ZONE)	MONTGOMERY (ZONE)	AR	06/19/2012	14:15	CST-6	Wildfire		0	0	0.00K	0.00K
Totals:								0	0	0.00K	0.00K

Storm Events Database - Search Results | National Centers for Environmental Information (noaa.gov)

August 20, 2011, marked the beginning of the 'Statehouse Mountain Fire.' This fire burned within the Ouachita National Forest for several days, causing massive destruction. The fire roared on for almost two weeks, eventually burning 388 acres of the National Forest land. September 2011 marked the fire burnout from this event.

Montgomery County experienced a lightning strike which started a wildfire on the Christopher Mountain located within the Ouachita National Forest. The fire raged into the next day, causing residents to evacuate their homes on private land. The 'Christopher Mountain Fire' burned 706 acres altogether. The lightning strike hit on September 14, 2011.

Lightning struck the Planning Area on June 19, 2012, beginning the 'Shelterwood 149 Fire' that burned for over a week. The fire started in the Government Hill area, approximately 2.75 miles NNE of Sims, Arkansas. The fire burned 685 acres of Ouachita National Forest land; however, no structures were lost to this event.

Probability of Future Events

There are potentially many more wildfires in the Planning Area than documented. However, due to the multiple ways of documenting or classifying fires at the time of reporting those numbers may not be captured in this document. The Planning Area has experienced only seven wildfires between 2000-2023. The probability of the Planning Area experiencing a wildland fire is approximately 0.8%. Based upon previous occurrences (7 events over an 11-year period). Probability is estimated using the following formula:

Probability is estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \text{ x100} = \_\_\_\_\_$$

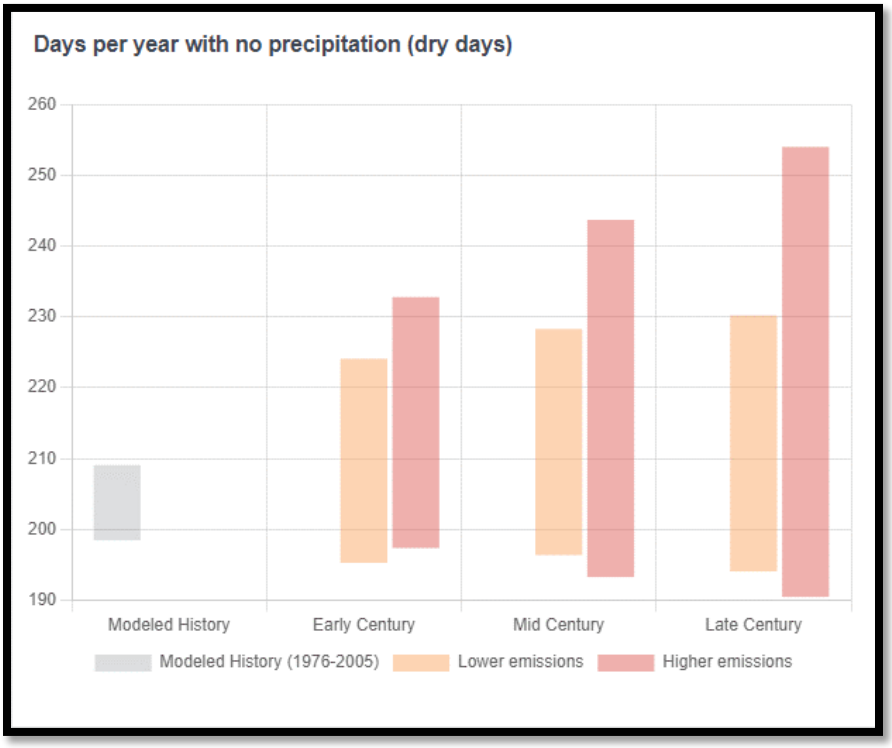
Data collected from 2000-2023 was equal to 8,395 days.

Future Climate Indicators

Indicator	Modeled History (1976 - 2005)	Early Century (2015 - 2044)		Mid Century (2035 - 2064)		Late Century (2070 - 2099)	
		Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions	Lower Emissions	Higher Emissions
	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max	Min - Max
Precipitation:							
Days per year with no precipitation (dry days)	**203 days** 195 - 209	**206 days** 195 - 220	**207 days** 197 - 233	**207 days** 196 - 223	**209 days** 192 - 243	**208 days** 194 - 226	**213 days** 190 - 255
Maximum number of consecutive dry days	**16 days** 14 - 20	**17 days** 14 - 21	**17 days** 14 - 20	**18 days** 15 - 21	**17 days** 14 - 22	**18 days** 15 - 25	**18 days** 15 - 26
Days per year with precipitation (wet days)	**163 days** 156 - 170	**159 days** 146 - 170	**158 days** 132 - 168	**158 days** 142 - 170	**156 days** 122 - 174	**157 days** 140 - 171	**152 days** 110 - 175
Temperature thresholds:							
Annual days with maximum temperature > 90°F	**63 days** 63 - 75	**92 days** 74 - 113	**95 days** 73 - 116	**103 days** 75 - 127	**111 days** 88 - 130	**114 days** 87 - 144	**142 days** 112 - 168
Annual days with maximum temperature > 100°F	**7 days** 6 - 9	**19 days** 5 - 37	**21 days** 7 - 54	**27 days** 6 - 57	**35 days** 15 - 84	**36 days** 12 - 57	**68 days** 30 - 117

N/A = Data Not Available for the selected area

Days per year with no precipitation (dry days)	207.8 Days + 4.3 since 1976-2005	208.9 Days + 5.4 since 1976-2005
Maximum number of consecutive dry days	17.6 Days + 0.7 since 1976-2005	17.6 Days + 0.7 since 1976-2005
Days per year with precipitation (wet days)	157.4 Days - 4.3 since 1976-2005	156.3 Days - 5.4 since 1976-2005
Annual days with maximum temperature > 90°F	78.9 Days + 24.5 since 1976-2005	81.0 Days + 26.6 since 1976-2005
Annual days with maximum temperature > 100°F	12.6 Days + 8.9 since 1976-2005	14.4 Days + 10.7 since 1976-2005



CMRA - Climate Mapping For Resilience and Adaptation (arcgis.com)

Climate mapping trends indicate a rise in the number of dry days, maximum number of consecutive dry days, and a decrease in the number of wet days. This combined with rising temperatures, and a sharp increase in annual days with maximum temperatures greater than 100˚F could lead to an increase in wildfire for the Planning Area.

According to FEMA's National Risk Index, the Planning Area's risk index is very low (54.7) compared to the rest of the U.S.:

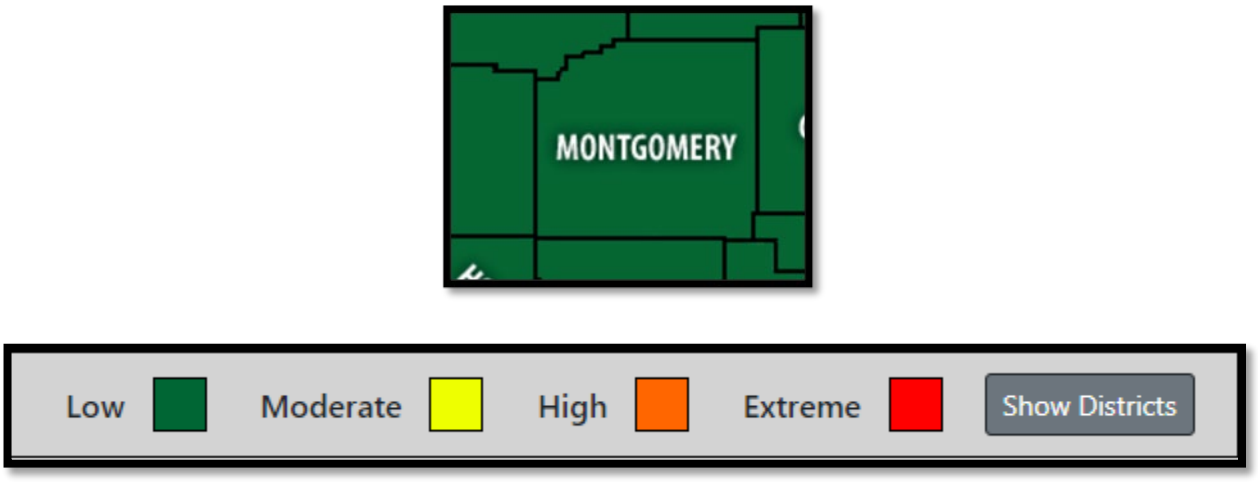
Hazard Type	Expected Annual Loss Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Wildfire	$43,738	Relatively Moderate	Very Low	1.27	$55.115	54.7

FEMA's Expected Annual Loss Values:

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Wildfire	$43,738	$40,222	$3,473	0.00	$42

See supporting documents section for full FEMA National Risk Index report.

Wildfire Danger



To find out the most recent wildfire danger and current burn bans please click the link:
Wildfire Map : Arkansas Forestry Division
The Forestry Division is asking you to report fires by calling 1-800-468-8834

Vulnerability and Impact of Wildfires

Wildfires can result in significant damage to the Planning Area including risk to human life, property damage, agricultural impacts, as well as cutting off access to utilities, emergency services, and evacuation routes.

Rural areas of the Planning Area are dependent on local volunteer fire departments to protect and prevent the loss of life, property, and the natural environment.

Wildfires moving into residential areas and along roadways place the population at risk due to smoke inhalation and burn wounds. Firefighters responding to wildfires may be at an increased risk of injury or death. Area evacuations due to fires could put individuals at additional risk.

Wildfires may impact the economy by destroying crops and farm animals. Business may be damaged or destroyed, forcing them too permanently close. Much of the Planning Area is rural containing large amount of timberland, farmland, and pastures for animals. Livestock and product sales continue to be a major source of income for farmers.

Wildfire may cause utility outages placing those even out of the path of the wildfire at risk.

The Planning Area does not currently have a large Wildland Urban Interface (WUI). However, the Planning Area has been experiencing a population increase. As population increases, so will land use and WUI. The WUI creates an environment in which fire can move readily between structural and vegetation fuels.

The conditions of drought, lightning, and extreme heat increase the risk of wildfire incidents in the Planning Area.

Climate

Changes in the climate are anticipated to increase warming and the likelihood of drought. Both of these changes may heighten the frequency and severity of wildfires across the planning area. These impacts will be monitored by the planning team over the next 5 years. Research will be documented for nature-based solutions to mitigate potential increased impact.

Population

Changes in population will affect the impact of wildfires. As populations grow, more individuals and infrastructure will be impacted by wildfires. These impacts will be monitored by the planning team over the next 5 years. Research will be documented for nature-based solutions to mitigate potential increased impact.

Land Use

As land is developed, the risk of wildfires can become greater if precautions are not taken. Constructing residential buildings in close proximity to flammable vegetation or other materials can degrade the Wildland Urban Interface Risk. However, ensuring defense zones are included during new construction can minimize the risk of fire damage. Land use impacts will be monitored by the planning team over the next 5 years. Research will be documented for nature-based solutions to mitigate potential increased impact.

4.8.10 Winter Weather

Description

A winter storm is a combination of severe winter weather types occurring over a wide area. Winter storm formation requires below freezing temperatures, moisture, and precipitation. Severe winter storms include heavy snowfall, ice storms, strong winds, extreme cold, and/or freezing fog.

The National Weather Service defines a winter weather event as a winter weather phenomenon (such as snow, sleet, ice, wind chill) that impacts public safety, transportation, and/or commerce. It typically occurs during the climatological winter season between October 15 and April 15.

Types of winter warnings

Warning Type	Description
Blizzard Warning	Blizzard event is imminent or expected in the next 12 to 36 hours. Sustained wind or frequent gusts greater than or equal to 35 mph will accompany falling and/or blowing snow to frequently reduce visibility to less than 1/4 mile for three or more hours.
Ice Storm Warning	An ice storm event is expected to meet or exceed local ice storm warning criteria in the next 12 to 36 hours. Criteria for ice is 1/2 inch or more over at least 50 percent of the zone or encompassing most of the population.
Winter Storm Warning	A winter storm event (heavy sleet, heavy snow, ice storm, heavy snow and blowing snow or a combination of events) is expected to meet or exceed local winter storm warning criteria in the next 12 to 36 hours. Criteria for snow is 7 inches or more in 12 hours or less; or 9 inches or more in 24 hours covering at least 50 percent of the zone or encompassing most of the population. Use "mid-point" of snowfall range to trigger warning (i.e 5 to 8 inches of snow = warning). Criteria for ice is 1/2 inch or more over at least 50 percent of the zone or encompassing most of the population.
Wind Chill Warning	Wind chill temperatures are expected to meet or exceed local wind chill warning criteria in the next 12 to 36 hours. Wind chill temperatures may reach or exceed -25°F.

National Weather Service (weather.gov)

Severe winter storms produce heavy snowfall, sleet, ice, and/or freezing rain. They can also include extreme cold temperatures and high winds, intensifying the impact of the storm. Severe winter weather impacts travel causes widespread power outages, damages property, and can result in fatalities and injuries.

Locations Affected by Winter Storms

There is no defined geographical hazard boundary. Winter storms are typically widespread. The entire Planning Area is susceptible to severe winter storm events. Higher elevations typically experience lower temperatures and higher probability of frozen precipitation. Geographical features influence wind chill. The more rural areas of Plumerville, Oppelo, Menifee, and the Unincorporated areas of Montgomery County are more vulnerable to the effects of a winter storm.

Extent, Magnitude and Severity of Winter Storms

The magnitude and severity of winter storms are affected by the duration of the storm. Factors such as the precipitation type (snow compared to ice), rate, and amount affect the storm's impact.

According to National Climatic Data Center (NCDC) and National Weather Service Data, typical snow accumulations in the Planning Area during heavy snow and winter storm events range from 1 inch to 8 inches of snow. Typical ice storm accumulations range from 1/10 of one inch to 1/2 of an inch of ice. However, the Planning Area had a record snowfall of 18.5 inches on February 19, 1921. Therefore, historically the Planning Area can expect 1-18.5 inches of snow/ice.

When severe winter storm events do occur (the worst typically associated with ice), they are usually widespread over the area and impede the movement of vehicles. They limit regular movement of traffic, cause accidents, and limit responsiveness of emergency services. Power lines and communication networks can also be downed. Structures may sustain serious damage creating potentially critical conditions for the entire area.

School Districts located in the Planning Area monitor weather updates via television, radio and internet. If weather becomes hazardous as determined by the Superintendent, then appropriate actions are taken. There is not an actual policy on inclement weather response. Instead, the school administrators use their judgement based on weather forecast, time of day, and location of students to implement actions.

Extreme low temperatures and wind chill can also significantly affect the impact of winter storms. The lowest temperature ever recorded in the Planning Area was 16.3 °F, which occurred in January 1918. The average low temperature for the winter months is approximately 30 °F.

When temperatures below 32-40 degrees, students may be kept inside by the determination of school principals to protect against extreme cold temperatures. Wind chill would be the determining factor in keeping students inside.

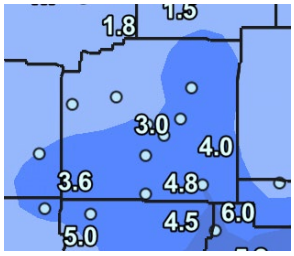
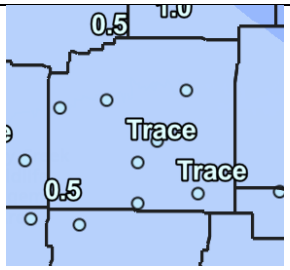
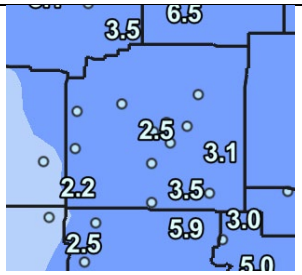
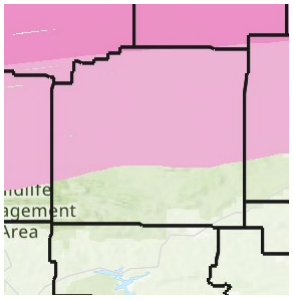
Previous Occurrences

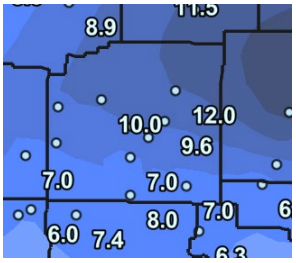
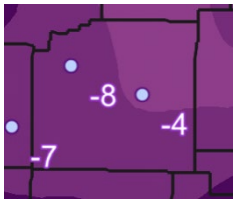
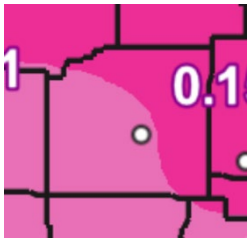
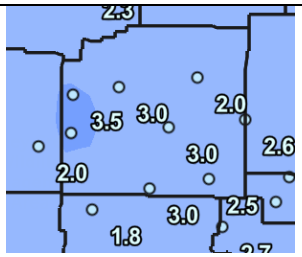
From 2000 to 2023, the National Weather Service recorded 23 severe weather events in the Planning Area, although only seven events resulted in significant property damage. No injuries or deaths were attributed directly to the severe winter weather. These events were classified as winter storms, ice storms, and heavy snow. Three ice storms (Dec 2000 and Jan 2009) resulted in declared disasters per FEMA.

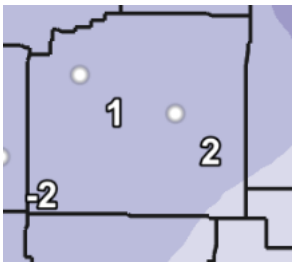
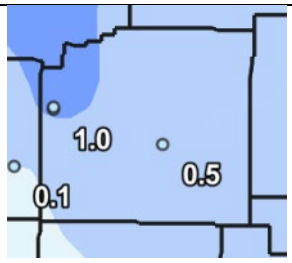
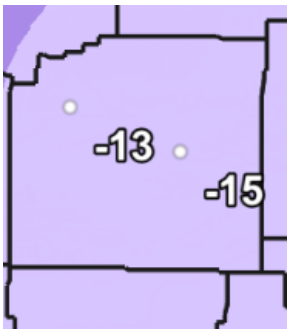
County	Date	Type	Death	Injury	Property Damage
Montgomery	1/27/2000	Winter Storm	0	0	$0.00
Montgomery	12/13/2000	Winter Storm	0	0	$0.00
Montgomery	12/25/2000	Ice Storm*	0	0	$0.00
Montgomery	2/5/2002	Winter Storm	0	0	$0.00
Montgomery	2/24/2003	Winter Storm	0	0	$0.00
Montgomery	2/26/2003	Winter Storm	0	0	$0.00
Montgomery	2/14/2004	Ice Storm	0	0	$0.00
Montgomery	12/22/2004	Winter Storm	0	0	$0.00
Montgomery	03/06/2008	Winter Storm	0	0	$0.00
Montgomery	01/28/2010	Winer Storm	0	0	$0.00
Montgomery	02/08/2010	Winter Storm	0	0	$0.00
Montgomery	12/25/2012	Winter Storm	0	0	$3.000M
Montgomery	12/26/2013	Winter Storm	0	0	$100.00K
Montgomery	02/04/2014	Ice Storm	0	0	$300.00K
Montgomery	03/02/2014	Winter Storm	0	0	$25.00K
Montgomery	02/19/2015	Ice Storm	0	0	$150.00K
Montgomery	02/25/2015	Winter Storm	0	0	$0.00
Montgomery	02/02/2022	Winter Storm	0	0	$0.00
Montgomery	01/30/2023	Ice Storm	0	0	$0.00
Eastern and Central Montgomery County	02/23/2022	Winter Storm	0	0	$0.00
Montgomery	02/23/2022	Winter Storm	0	0	$0.00
Eastern and Central Montgomery County	01/24/2023	Winter Storm	0	0	$0.00
Northern Montgomery County	02/01/2023	Ice Storm	0	0	$0.00
Total			0	0	3.575M

NCDC NOAA Storm Database: Montgomery County

The National Weather Service in Little Rock maintains an Arkansas Winter Storm Database. The database includes severe winter weather events from 2011. From the database, the following significant events impacted the Planning Area:

February 9-11, 2011 Heavy snow fell in much of northern and central Arkansas, with as much as two feet accumulated in parts of the Ozarks. The snow was followed by bitterly cold arctic air, with most places recording the coldest February temperatures since 1996 or 1951. Some locations in northern and central Arkansas recorded their coldest temperatures since the December 1989 Arctic outbreak	 Snow Accumulation
December 25-26, 2012 Record heavy snow fell on top of some light freezing rain in much of western, central, and northeast Arkansas. Many locations saw the snowiest December on record, just from this one storm. The ice and heavy snow downed trees and caused widespread power outages, especially around Little Rock. Clark County experienced snowfall of 2-5 inches.	 Snow Accumulation
March 1-4, 2014 Snow & Sleet (blue) and Freezing Rain (pink) A strong Arctic front stalled in southern Arkansas. Heavy rain fell. Behind the front, freezing rain, sleet and snow accumulated in northern and central Arkansas. Three to five inches of snow fell in northern Arkansas, with one to three inches of sleet and snow in the central on top of a quarter to half inch of freezing rain.	 Snow Accumulation  Freezing Rain

February 14-18, 2021 Within the span of five days, beginning on February 14th and lasting through the 18th, two significant winter storms affected Arkansas I back to back fashion. The storms produced record snowfall and snow depths across the state. Additionally, record Arctic cold set in, with low temperatures below zero around most of the state. Very Col Arctic air moved in behind the system, with widespread below zero temperatures in much of the state. The morning of the 16th brought the coldest temperatures of the Arctic Snap, however a prolonged period of high temperatures below freezing also preceded and accompanied the cold snap.	 Snow Accumulation  Arctic Snap Low Temperatures
February 24-25, 2022 On February 24-25, 2022, the state was impacted with less snow, and greater coverage of primarily sleet and freezing rain, driving widespread travel impacts. The greatest ice accumulations were observed over central and eastern Arkansas, with ice accruals as thick as one-half inch to three-quarters of an inch common, and over one inch of ice reported near Searcy (White County), and a light glazing of ice more common elsewhere in the state. In addition to travel impacts, over 30,000 power outages were reported over eastern Arkansas where ice accumulations were the most significant.	 Sleet / freezing rain
March 11, 2022 On March 11, 2022, a late-season winter weather event impacted much of the state, with the greatest snow totals observed over much of central Arkansas, and eastern portions of the state near the Mississippi River. Snow totals of 3 to 5 inches were common around the Little Rock and Conway metro areas, with most other locations receiving 2 to 3 inches of snow.	 Snow Accumulation

December 22, 2022 A strong Arctic cold front swept through the state on the afternoon of December 22, bringing northwesterly winds of 30 to 40 mph to portions of the area. Extremely cold air was ushered into the state overnight, with low temperatures on the morning of December 23, falling to their lowest values the state had seen in the month of December since 1989. Single-digit air temperatures were common over central and southern Arkansas, with much of northern Arkansas and the higher terrain regions falling into the negative single-digits. Strong winds associated with the cold front drove wind chill values into the negative teens and twenties across much of central and northern Arkansas on the morning of December 23	 Wind Chill Values
January 14-16, 2024 A winter storm impacted mostly northern Arkansas as an Arctic Air Outbreak overspread across the central and southern United States. A band of totals from four to seven (or more) inches of snow was observed across northern Arkansas and the higher terrain of the Boston Mountains/Ozark National Forest. Over the central and southern portions of the state, sleet was much more predominant, and this lowered snow totals to one to three inches, despite bitter cold temps near the surface. Numerous cold mornings were observed, with progressively colder mornings observed daily through the Arctic Air outbreak, but most areas saw their coldest reading on the mornings of January 16th or the 17th. In addition to record cold lows, several area locations set records for daily "low-high" temperatures on both January 15th and 16th.	 Snow/Sleet accumulation  Minimum observed air temperatures

Probability of Future Events

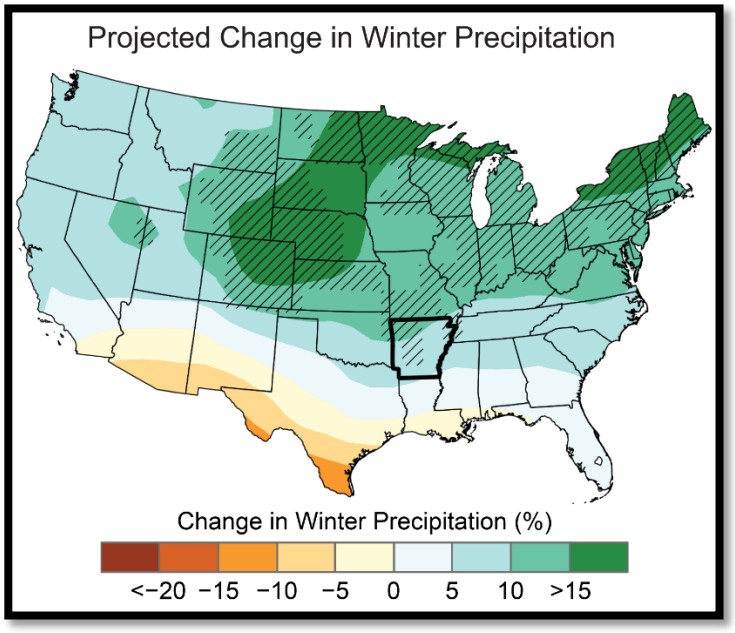
The probability the Planning Area will experience a severe winter storm event is less than 1% per year. Based upon previous occurrences (23 events between 2000 and 2023), the probability is estimated using the following formula:

$$\frac{\text{\# of events}}{\text{\# of days}} \times 100 = \_\_\_\_\_$$

Data collected from 2000-2023 was equal to 8,395 days.

The Planning Area has experienced 0.002 events per year since 2000. Based on climate research, Arkansas' wintertime precipitation is expected to increase. NOAA National Centers for Environmental Information performed a State Climate Summary in 2022. According to their research,

> Wintertime precipitation is projected to increase in Arkansas by midcentury (see figure below), with the increase being in the form of rain rather than snow. In the other seasons, precipitation changes are uncertain. Increases in evaporation rates due to rising temperatures may increase the rate of soil moisture loss during dry spells. As a result, naturally occurring droughts are projected to be more intense.



Projected changes in total winter (December–February) precipitation (%) for the middle of the 21st century compared to the late 20th century under a higher emissions pathway. Hatching represents areas where the majority of climate models indicate a statistically significant change. Arkansas is part of a large area of projected increases in winter precipitation across the United States. Sources: CISESS and NEMAC. Data: CMIP5.

Based on historical evidence, the planning team determined the likelihood of future winter storms is HIGH.

Vulnerability and Impact of Winter Storms

There are no defined boundaries for winter storms. The entire Planning Area is vulnerable to the impacts of winter storms.

According to National Climatic Data Center (NCDC) and National Weather Service Data, typical snow accumulations in Montgomery County during heavy snow and winter storm events ranges from 1 inch to 6 inches. Typical ice storm accumulations range from 1/10 of one inch to 1/2 of an inch.

Historical data reports that the Planning Area has had 23 winter weather events in the last 23 years. This means theoretically the Planning Area can expect at least one winter weather event per year. Damage from winter storms is often not reported to public agencies for recording in databases such as SHELDUS.

The overall impact of a severe winter storm is high for the Planning Area. When severe winter storm events occur (the worst typically associated with ice) they are usually widespread over the Planning Area. Winter storms can cause dangerous travel conditions, impeding movement of vehicles, causing accidents, and limiting responsiveness of emergency services. Structural damage places communities and individuals at risk. Utilities including electricity, water, and communications can be lost.

Winter storms can immobilize the entire Planning Area. Wet snow quickly turns into ice rendering roads impassable, damaging trees, power lines, cutting off power/communications, and causing death.

The School Districts of Mount Ida, Ouachita River School District – Oden Campus and Caddo Hills school officials monitor weather updates via television, radio, and internet. If weather becomes hazardous, as determined by the superintendent, then appropriate actions are taken based on students being in school or getting ready to come to school. There is not an actual policy on inclement weather; the school administrators use their judgment decision as to closing school due to inclement weather.

If weather is due to snow or ice, and either is forecasted to become hazardous, by the determination of the school official's school may be cancelled. If weather becomes hazardous after school has started school officials may dismiss school early, if road conditions are safe to do so.

Students may be kept inside by the determination of the building principals if there are extreme cold temperatures. Wind chill would be the determining factor in keeping students inside. Some districts initiate monitoring for wind chill is below 32 degrees, some 40 degrees.

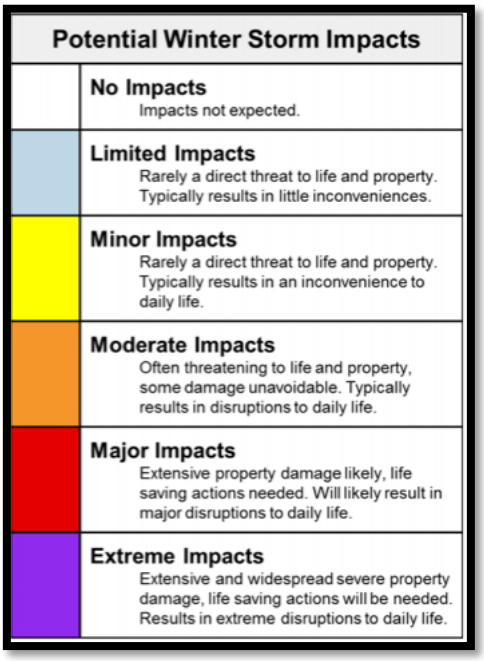
Winter storms may bring strong winds, freezing rain, snow, ice, and blizzard like conditions that limit visibility. During a winter weather event, roads will likely be impassable. The availability of emergency and essential services will be restricted throughout all participating jurisdictions. Ice accumulation may leave roads, bridges and culverts damaged. The County Road Department does not have access to equipment for clearing roads. However, due to the extent of winter weather, there will be limited manpower for clearing roads in the Planning Area. Roads will be cleared on a priority bases. The Planning Area may not have the capabilities to clear rural and unpaved roads.

Road conditions as described may leave motorists stranded, interrupt supply chains, and disrupt lifesaving services.

All people and structures in the Planning Area are vulnerable to downed limbs and trees. Ice accumulation on tree branches may cause limbs to fall on people or structures causing minor to extreme impacts. Then damage may be caused directly by the excessive weight of the ice/snow accumulation, or by ice-laden trees or branches falling on structures. Homes, businesses, as well as weaker nonresidential structures are most vulnerable to this type of structural damage. The abundant wood structures and manufactured houses in the planning area are much more vulnerable than steel, concrete, or masonry structures. Past storms indicate that poultry houses are particularly vulnerable.

The entire Planning Area is at risk of extended power outages resulting in exposure to freezing temperatures. Rural areas of the Planning Area are most at risk of losing power and becoming isolated during a winter storm. Children under the age of 5, adults over the age of 65, those with disabilities, economically challenged, and the unhoused are at the greatest risk of hypothermia and other life-threatening health problems.

In addition to hypothermia risks, there is a greater risk of fire, carbon monoxide (CO) poisoning, electrical shock, or electrocution during winter weather due to increased use of portable heaters and generators. According to a 2013 Consumer Product Safety Commission report, half of the generator-related deaths happened in the four coldest months of the year, November through February, and portable generators were involved in the majority of carbon monoxide deaths involving engine-driven tools. According to the National Fire Protection Association (NFPA), home fires occur more in the winter than in any other season, and heating equipment is involved in one of every six reported home fires, and one in every five home fire deaths ("Put a Freeze on Winter Fires", NFPA) ("Extreme Cold Guide", CDC). In addition, frozen pipes and impassable roads may impede firefighting efforts.



Severe winter weather also negatively impacts the Planning Area's economy. Businesses are closed due to snow and ice as well as power outages. Infrastructure can be damaged by a buildup of ice and snow. Extreme cold can rupture pipes. The agricultural sector can be impacted by damaged crops and lost farm animals from winter weather events.

Estimating Potential Loss

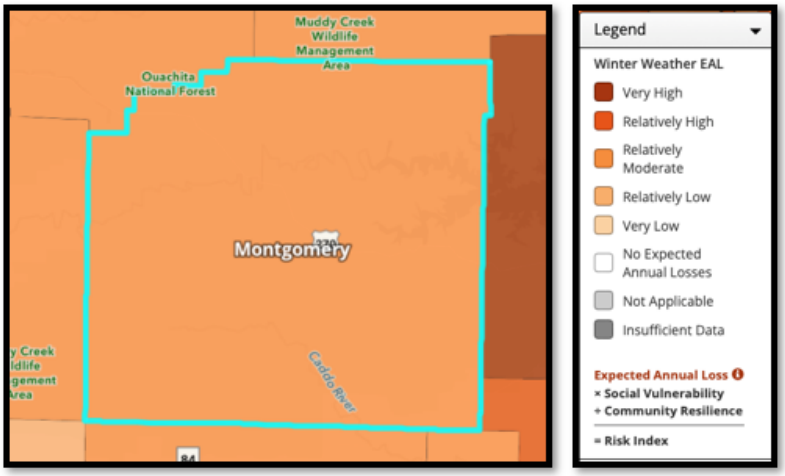
Expected annual loss was calculated for the Planning Area at https://hazards.fema.gov/nri/map.

Expected annual loss scores are calculated using an equation that combines values for exposure, annualized frequency, and historic loss rations for the hazard type.

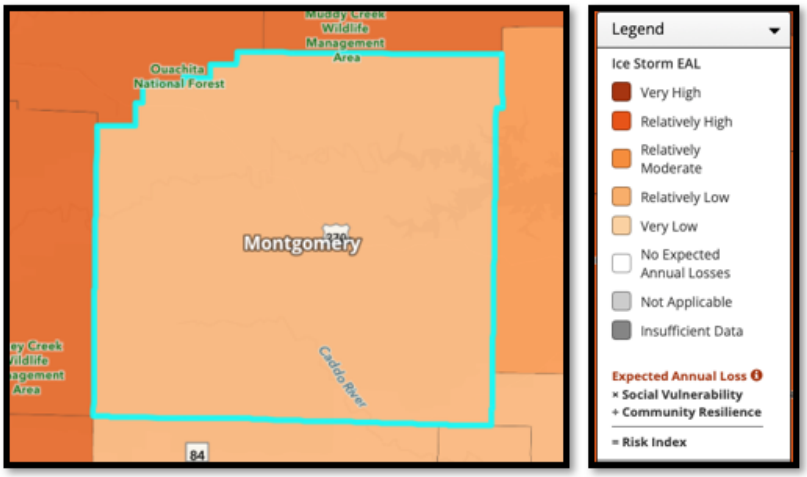
Expected Annual Loss Overview	
Composite Expected Annual Loss	**$2,059,235.15**
Building EAL	**$1,129,480.25**
Building EAL Rate	**$1 per $1.58K of building value**
Population EAL	**0.08** fatalities
Population EAL Rate	**$1 per 110.37K people**
Population Equivalence EAL	**$891,363.22**
Agricultural EAL	**$38,391.68**
Agricultural EAL Rate	**$1 per $829.76 of agricultural value**

Ice Storm	**Relatively Low** Score: **50.4**
0	100
Expected Annual Loss	**$52,874.00**
Exposure	**$100B**
Frequency	**0.8** events per year
History Loss Ratio	**Relatively Low**

Winter Weather	**Relatively Moderate** Score: **63.6**
0	100
Expected Annual Loss	**$78,943.00**
Exposure	**$100B**
Frequency	**1.5** events per year
History Loss Ratio	**Relatively High**

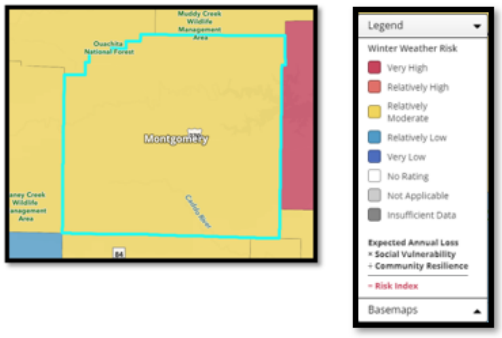


https://hazards.fema.gov/nri/map



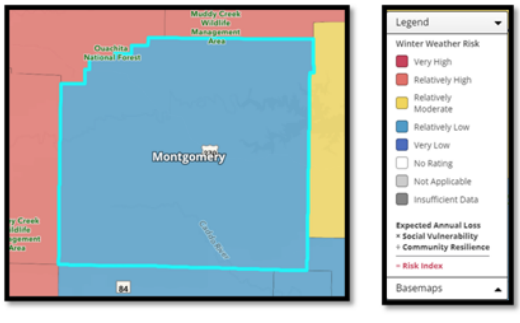
https://hazards.fema.gov/nri/map

National Risk Index Winter Weather



https://hazards.fema.gov/nri/map

National Risk Index Ice Storm



https://hazards.fema.gov/nri/map

Population

Changes in population will affect the impact of winter storms. As populations grow, more individuals and infrastructure will be impacted by winter storms. Currently the Planning Area is trending an increase in population. Over the next five years the Planning Team will need to research and document the effects of population on winter weather.

Land Use

Changes in land use could impact the effects of a winter storm. The Planning Area has both agricultural and industrial areas, which are affected by winter storms. Over the next five years the Planning Team will need to research and document changes in land use and its effects on the Planning Area.

Climate

According to NOAA National Centers for Environmental Information wintertime precipitation is projected to increase. The increase will consist of more rain than snow. The challenges posed by climate change can increase the probability of extreme weather events including winter storms and ice storms. These impacts will be monitored by the planning team over the next 5 years to continue research for nature-based solutions to mitigate all possibilities of potential increased impacts.

Multi-Jurisdictional Risk Assessment

The entire Planning Area is affected by winter storms. Winter storms are not unique to any portion of the Planning Area. The occurrence of severe winter storms can have a substantial impact on the Planning Area's buildings, utility systems, transportation systems, and agriculture. Heavy accumulations of ice or snow commonly result in damage to buildings. Damage may be caused directly by the excessive weight of the ice/snow or by ice-laden trees or branches falling on structures. Homes, businesses, as well as weaker nonresidential structures are most vulnerable to this type of structural damage. The abundant wood structures and manufactured houses in the planning area are much more vulnerable than steel, concrete, or masonry structures. Past storms indicate poultry houses are particularly vulnerable. Heavy accumulations of ice or snow as well as high winds can bring down trees, electrical wires, telephone poles and lines, and communication towers. Communication and power can be disrupted for days or weeks while utility companies repair the damage. Power and communication disruptions are common consequences of ice storms and heavy snow. Transportation systems are vulnerable to severe winter storms. Accumulations of ice and snow can be extremely hazardous to motorists. The planning area lacks the necessary snow removal equipment due to the infrequent occurrence of severe winter storms. Motorists in the Planning Area are not accustomed to driving on icy roads. These factors result in an increase in traffic accidents. When major roads are blocked, travel flow and the availability of essential services throughout the area is affected.

SECTION 5 MITIGATION STRATEGIES

The Montgomery County Hazard Mitigation plan includes a mitigation strategy that provides the Planning Area's blueprint for reducing the potential losses identified in the risk assessment, based on existing authorities, policies, programs and resources, and its ability to expand on and improve these existing tools.

The County, Cities, and School District have varying capabilities for implementing and maintaining mitigation efforts. These capabilities depend on existing authorities, policies, programs, and resources.

The cities of Black Springs, Mount Ida, Norman, and Oden are each different in terms of staffing, funding, policies, and programs capabilities providing the ability to carry out their local hazard mitigation goals. However, each city has the capability to:

- be an active member in the NFIP,
- to pass mitigation ordinances for their local government,
- regulate and limit the development in wildfire hazard areas and flood prone areas through land use planning implement retrofit construction plans,
- brace equipment
- provide emergency preparedness information to area residents through FEMA brochures.

The entire Planning Area is dependent upon grant funding to assist with larger mitigation projects. Examples of projects that may be requested:

- Safe Rooms
- Heavy Duty Generators (back up and maintain electrical power for critical facilities)
- Communication and early warning systems
- Heating/Cooling Centers
- Flood Inundation Study for the Planning Area
- Flash Flood Inundation Studies
- Inspection, Maintenance, and Enforcement Programs for High-Risk Dams

5.1 Mitigation Goals and Objectives for Each Hazard

Based upon the results of the local and State risk assessments, the Montgomery County Hazard Mitigation Planning Team, with input from local jurisdictions and officials, developed hazard mitigation goals and objectives and selected those that were determined to be of greatest benefit. These goals and objectives represent what Montgomery County believes is a long-term vision for reduction and enhancement of mitigation capabilities.

Goal 1: Reduce the potential for loss of life, injury and economic damage created by exposure to natural hazard for residents of Montgomery County due to natural disasters.

- Identify, describe, and characterize the natural hazards to which Montgomery County is susceptible Objective
- Assess the risk of each hazard including probability and frequency, exposure, and consequences Objective
- Examine feasible mitigation opportunities appropriate for the identified hazards and prioritize those opportunities.
- Implement mitigation actions to reduce loss of lives and property Objective
- Identify mitigation opportunities for long-range planning consideration.
- Encourage members of the Montgomery County Local Emergency Planning Committee (LEPC) and other stakeholders to include mitigation measures in emergency planning efforts.
- Promote NFIP compliance throughout the County.

Goal 2: Provide a framework and coordination to encourage all levels of government and public and private organizations to undertake mitigation to minimize potential disasters and to employ mitigation in the recovery following disasters.

- Hold regular LEPC meetings to discuss mitigation actions with city officials, County emergency office, and private sectors.
- Keep records of all natural hazards and analyze areas that are at risk to prevent future losses.

Goal 3: Seek grants for mitigation projects through the State and Federal funding.

- Update Hazard Mitigation plan every 5 years.
- Inquire grant information from Arkansas Department of Emergency Management, and Planning and Development District.

Goal 4- Protect existing properties from natural disasters.

- Protect existing structures from natural hazards using cost-effective approaches.

5.2 Implementation of Mitigation Actions

The mitigation actions are prioritized based upon their effect on the overall:

- Risk to life
- Risk to property
- Ease of implementation
- Community
- Agency support
- Ability to obtain funding

The County and participating jurisdictions have used the STAPLEE method to prioritize mitigation actions. This method has the benefit that the Mitigation actions are considered in discrete categories of:

- Social
- Technical
- Administrative
- Political
- Economic
- Environmental

Prioritization can be effectively conducted by meticulously considering each of these categories. By comprehensively analyzing each aspect, potential oversights can be minimized, enabling a thorough evaluation of the most appropriate actions for each jurisdiction to contemplate.

Criteria used for prioritization and review of mitigation actions based on STAPLEE

Evaluation Category	Sources of Information
Social	Members of Local governments and the County Government were members of the Hazard Mitigation Planning Team and had input throughout the planning process. It must be noted that many small-town political leaders are also business or professional persons. They are also members of the LEPC. Existing community plans were and will be relied on wherever possible. Members of the media were contacted and invited to all attend all HMPT meetings.
Technical	The following persons/agencies were consulted as to the technical feasibility of the various projects: Arkansas Geological Commission, University of Arkansas Extension Service, Arkansas Soil and Water Conservation Commission, Arkansas Health Department, Arkansas Highway and Transportation Department, Arkansas Department of Environmental Quality, Arkansas Governor's Pre-Disaster Advisory Council, Arkansas Governor's Earthquake Advisory Council, and Arkansas Forestry Service. Arkansas Department of Emergency Management. All of these had their comments and suggestions incorporated.
Administrative	Staffing for proper implementation of the plan currently will rely largely on existing members of the various agencies involved. Technical assistance is available from various local and state agencies. Some local jurisdictions have incorporated Hazard Mitigation efforts into their Capital Improvement Plans. Operations costs are under discussion by the appropriate agency or department heads.
Political	The County Quorum Court has passed resolutions in support of mitigation activities involving floodplain ordinances, mitigation planning, and fire districts, among others. The

	Governor of Arkansas issued an Executive Order in August of 2004 (EO 04-02) instructing all state agencies to assist ADEM in mitigation planning and implementation of mitigation goals.
Legal	Members of the HMPT discussed legal issues, and it was their opinion that no significant legal issues were involved in the projects that were selected by the HMPT. However, where legalities may be an issue, this is noted.
Economic	Economic and benefit cost issues were the predominant topics discussed by all concerned. Each entity felt that the projects selected would have positive effects, but yet realized that actions often have costs, sometimes hidden, imposed on the community, residents, and businesses. Funding for the various activities was a major concern as local budgets are always under pressures with existing and competing projects and activities. Where necessary, particularly for costly capital projects, outside grants would be relied on heavily.
Environmental	The Arkansas Geological Survey, Arkansas Department of Environmental Quality, Arkansas Forestry Commission, and Arkansas Soil and Water Conservation Commission were all consulted as to the environmental impact of the various projects and it was felt that there would be no negative impact. Local environmental issues and concerns were also taken into consideration.

The Montgomery County Office of Emergency Management (CCOEM) will be responsible for evaluating actions among competing actions. The Planning Team prioritized the list of mitigation actions by conducting a cost-benefit review. This review was conducted by:

1. Considering the number of people who would be affected by a chosen project.
2. Determining the area the project would cover.
3. Considering how critical the structures were within the project area.
4. Which structures were most critical?
5. How would it benefit the entire community?

The CCOEM shall evaluate actions based on funding availability, comparative value to mitigation objectives, and consideration of economic benefits and environmental concerns of the communities. Actions are prioritized in three different categories:

- **High** need for immediate action
- **Medium** need for action
- **Low** lacking in urgency

All Montgomery County actions are the responsibility of the Montgomery County Office of Emergency Management Director. Actions for the cities of Black Springs, Mt. Ida, Norman, and Oden are the responsibility of their respective Mayors. The School Districts of Caddo Hills, Mount Ida, and the Oden Campus of Ouachita River will be the responsibility of their School Board Administration.

The Responsible Agency for each mitigation action will identify resources. Their responsibility will be to examine resources from all levels of government. The responsible parties will integrate the requirements of the mitigation plan into other plans when appropriate. This will also include funding and support for enacting and enforcing:

- Building codes
- Zoning ordinances
- Developing public education programs

- Alert residents to risks
- Alert resident how they can reduce hazard losses.

Plans will be made to earmark resources for implementing these actions.

Each jurisdiction and school district within the Planning Area that participated in the planning process has at least two actions that will benefit the jurisdiction.

For the purpose of developing the Montgomery County Hazard Mitigation Plan, mitigation actions are categorized into six groups;

- Prevention: Actions that will keep problems from getting worse.
- Property Protection: Actions that address individual buildings
- Public Education and Awareness: Actions that will inform the public.
- Natural Resource Protection: Actions that will protect natural resources.
- Emergency Service Protection: Actions that will protect emergency services before, during, and immediately after an occurrence.
- Structural Projects: Actions that will control the hazard.

Previous Mitigation Actions

Previous Mitigation Action/Project list below have been:

- Updated to reflect changes over the past 5 years.
- Updated to reflect changes in economic growth.
- Updated to reflect changes in population growth.
- Updated to reflect changes in FEMA Plan requirements.

Certain initiatives, such as safe room construction, may have been pursued, albeit not achieving the desired level of coverage as envisioned by the Planning Area.

Completed Mitigation Actions/Projects	
Jurisdiction	Action/Project
Montgomery County	• March 7, 2018: Martin Simpson CR/Big Hill Creek Bridge • August 8, 2019: Sims Loop/ Rain Creek Bridge Mitigation Project • September 11, 2020: Smith Creek Bridge at Liberty Church Mitigation Project • August 11, 2021: Caney Creek Bridge Mitigation Project • July 27, 2022: Hole in the Ground Bridge Project
Montgomery County	Equipment upgrades to address power line design. Further upgrades needed will have to be addressed by the privately owned utility companies and is out of the Planning Areas control. However, as funds and opportunity arise, sections are being upgraded.
Montgomery County	Established Burn restrictions and water conservation measure for localized drought conditions.
Public Utility	The water plant has completed mitigation actions to brace equipment whose failure may disrupt the operation of critical facilities.

Mitigation Actions/Projects in Progress	
Jurisdiction	Action/Project
Montgomery County Office of Emergency Management	Provide mitigation information and resources for extreme weather conditions through an active education outreach program with specific plans and procedures for at-risk populations.
Montgomery County Office of Emergency Management	Use GIS to map hazard areas, at-risk structures, and associated hazards in order to assess high risk-areas.
Montgomery County	Implement retrofit construction to modify low water bridges at Cates Creek, Pine Ridge and Fancy Hill Communities located in the unincorporated areas of Montgomery County that are susceptible to flooding. 13 have already been replaced. This project will continue as funds are available and until it is complete.
Montgomery County (Sheriff Office)	Improve public awareness of tornado and high wind risks. The Sheriff's office is handing out pamphlets educating citizens on construction methods and natural landscaping around the home as well as use of the NOAA radio.
Montgomery County	A contract for Hyper Reach is in place for mass notification use. It will be used to: • Deliver countywide drought communication • Deliver targeted weather information for immediate threats of severe thunderstorm, flash flood, and tornado
Montgomery County	Provide emergency preparedness and Mitigation information and resources for all hazard events through an active educational outreach program with specific plans and procedures; for at risk population. • County Website • Fire Wise (Mt. Ida and Joplin) • Brochures • Fair Booth
School Districts	Safe Rooms have been placed in the following schools: • Oden (Pencil Bluff)
Arkansas Forestry Commission (through the Stafford Act with the assistance of the Montgomery County Fire Department)	Implements fuel management team using prescribed burning techniques to reduce the hazardous vegetative fuels that threaten public safety and property on public lands and working with landowner on private land, and near essential infrastructure.

Mitigation Actions/Projects
Construct safe rooms within new and existing public buildings, such as schools, libraries and community centers **Associated Hazard:** Thunderstorm Winds and Tornadoes **Type of Action:** Structural Project **Contribution to Mitigation Objective:** Prevent the loss of life by providing shelter during pre/post disasters. **Priority**: High **Rationale for Priority**: Past storm events **Addresses new or existing buildings:** new and existing **Cost Benefit:** Benefits outweigh cost. Possible grants for construction **TimeLine:** 5 years **Projected Resources**: HMGP and PDM funding **Responsible Party**: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden, School Districts of Caddo Hills, Mount Ida, and Ouachita River. **Mitigation Action adopted by:** Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden, School Districts of Caddo Hills, Mount Ida and Ouachita River. **STAPLEE**: Meets all Criteria
Pass ordinance requiring new and existing structures on temporary foundations to be securely anchored to permanent foundations **Associated Hazard:** Thunderstorm Winds, Tornado and Flood Waters **Type of Action:** Prevention **Contribution to Mitigation Objective:** Prevent the loss of life **Priority**: High **Rationale for Priority**: Thunderstorm Winds, Tornadoes and Flood Waters have been an issue in Montgomery County in the past. **Addresses new or existing buildings:** new and existing **Cost Benefit:** Little or no cost **TimeLine:** Less than one year **Projected Resources**: County funds to publish Ordinance **Responsible Party**: Montgomery County, Cities of Black Springs, Mount Ida, Norman, and Oden **Mitigation Action adopted by:** Montgomery County, Cities of Black Springs, Mount Ida, Norman, and Oden **STAPLEE**: Meets all Criteria
Brace equipment (such as mechanical equipment, chillers, and emergency generators) whose failure may disrupt the operation of a critical facility, such as the Montgomery County Nursing Home, Montgomery County Assisted Living and Caddo Hill, Mount Ida and Ouachita River School District's Oden Schools. **Associated Hazard:** Tornado and Thunderstorm Winds **Type of Action:** Structural **Contribution to Mitigation Objective:** Prevents damage to necessary operating equipment and injury to citizens **Priority**: High **Rationale for Priority**: Protection of critical operations equipment **Addresses new or existing buildings:** New and Existing **Cost Benefit:** Highly Beneficial, minimum cost **TimeLine:** 5 years **Projected Resources**: Existing county and school district resources **Responsible Party**: Montgomery County, City of Mount Ida, and Caddo Hills, Mount Ida, and Ouachita River School Districts. **Mitigation Action adopted by:** Montgomery County, City of Mount Ida, and Caddo Hills, Mount Ida, and Ouachita River School Districts. **STAPLEE**: Meets all Criteria

Protect exceptionally vulnerable populations for the impacts of severe weather events through identifying specific at risk populations in the events of long-term power outages by establishing and promoting accessible heating/cooling centers/shelters.

Associated Hazard: All Hazard Events
Type of Action: Prevention
Contribution to Mitigation Objective: Mitigates against loss of life and adverse health effects due to extreme temperatures.
Priority: High
Rationale for Priority: Prevention of loss of life due to extreme temperatures
Addresses new or existing buildings: N/A
Cost Benefit: Highly beneficial
TimeLine: 5 years
Projected Resources: Existing county and local resources
Responsible Party: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden.
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Norman, Mount Ida, and Oden.
STAPLEE: Meets all Criteria

Provide emergency preparedness and Mitigation information and resources for all hazard events through an active educational outreach program with specific plans and procedures; for at risk population.

Associated Hazard: All Hazard Events
Type of Action: Public Education and Awareness
Contribution to Mitigation Objective: Educate public how to be prepared to handle extreme temperatures and to be aware of those of high risk
Priority: High
Rationale for Priority: Prevention of loss of life due to extreme temperatures
Addresses new or existing buildings: N/A
Cost Benefit: Highly beneficial
TimeLine: 5 years
Projected Resources: FEMA brochures distributed by the Montgomery County Office of Emergency Management.
Responsible Party: Montgomery County Office of Emergency Management
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden and the Caddo Hills, Mount Ida, and Ouachita River School Districts.
STAPLEE: Meets all Criteria

Purchase heavy duty generators to back up and maintain electrical power for critical facilities, schools, and shelters to maintain power and water supply during disasters.

Associated Hazard: All Hazard Events
Type of Action: Emergency Services Protection
Contribution to Mitigation Objective: Continuation of water service and temperature control
Priority: High
Rationale for Priority: Past Disasters
Addresses new or existing buildings: N/A
Cost Benefit: Highly beneficial
TimeLine: 5 years
Projected Resources: County, local funding, and possible grant funding.
Responsible Party: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden and the Caddo Hills, Mount Ida, and Ouachita River School Districts.
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden and the Caddo Hills, Mount Ida, and Ouachita River School Districts.
STAPLEE: Meets all Criteria

Adopting Ordinances that limit development in areas that could be affected by flooding caused by dam failure.

Associated Hazard: Dam Failure, Landslides
Type of Action: Prevention
Contribution to Mitigation Objective: Prevent the loss of life and property by limiting the development in areas that could be destroyed or flooded during a dam failure.
Priority: Low
Rationale for Priority: There have been no past dam failures to give reason to rank high or medium.
Addresses new or existing buildings: New and Existing
Cost Benefit: Beneficial, no cost
TimeLine: 5 years.
Projected Resources: Montgomery County
Responsible Party: Montgomery County
Mitigation Action adopted by: Montgomery County
STAPLEE: Meets all Criteria

Apply window film to windows in public schools and public use buildings to prevent shattering.
Associated Hazard: Earthquake, Thunderstorm, Tornado
Type of Action: Prevention
Contribution to Mitigation Objective: Reduce risk of injury due to broken glass.
Priority: Medium
Rationale of Priority: Past Storm Events
Addresses New or Existing buildings: New and Existing
Cost Benefit: Highly Beneficial with little cost.
TimeLine: 5 years
Projected Resources: Existing County, City, and School Resources as well as potential grant funding. Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden and the Caddo Hills, Mount Ida and Ouachita River School Districts.
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Norman, Mount Ida and Oden and the Caddo Hills, Mount Ida, and Ouachita River School Districts.
STAPLEE: Meets all Criteria

Create a data base within each fire district to track those individuals at high risk of death such as children under the age of 5, disabled and elderly populations, shut-ins, the unhoused, and individuals dependent on medical equipment. Many of these individuals may need to be transported to cooling or heating stations, relocated to places with operating utilities if experiencing a utility outage, relocated due to flood or tornado hazard, or unable to recover in the event of dam failure, landslide, or earthquake.
Associated Hazard: All Hazards
Type of Action: Prevention
Contribution to Mitigation Objective: Prevent loss of life
Priority: High
Rationale of Priority: Past Storm Events
Addresses New or Existing buildings: NA
Cost Benefit: Highly beneficial with little cost
TimeLine: 5 years
Projected Resources: Little or no funding required. Used Hyper Reach and coordinate with 911 and Fire Departments
Responsible Party: Montgomery County
Mitigation Action adopted by: Montgomery County
STAPLEE: Meets all Criteria

Implement retrofit construction to modify low water bridges at Cates Creek the Pine Ridge and Fancy Hill communities located in the Unincorporated areas of Montgomery County that are susceptible to flooding.

Associated Hazard: Flood/Flash Flood, Landslides
Type of Action: Natural Systems Protection
Contribution to Mitigation Objective: Seeks to protect citizens by allowing school buses, residents, and emergency vehicles into and out of area.
Priority: High
Rationale for Priority: Due to past flooding issues that did not allow residents to leave area, or school buses to complete route, or access for emergency vehicles.
Addresses new or existing buildings: New and Existing
Cost Benefit: Benefit outweighs the cost
TimeLine: 5 years
Projected Resources: Existing County funds and possible grant funding
Responsible Party: Montgomery County
Mitigation Action adopted by: Montgomery County
STAPLEE: Meets all Criteria

Use the inundation study on the Mount Ida Water Supply Dam to develop mitigation measures such as facilitate acquisition projects, new zoning requirements, or elevation projects. Acquire reliable and current information relating to existing and new buildings and infrastructure, especially critical facilities located in or developed in the path of flooding from dam failure.

Associated Hazard: Dam Failure
Type of Action: Structural and Infrastructure
Contribution to Mitigation Objective: Seeks to protect citizens and property in path of dam failure by diverting flow from flood waters as a result of dam failure.
Priority: Low
Rationale for Priority: No past dam failures, avoiding a high or medium priority
Addresses new or existing buildings: New and Existing
Cost Benefit: Benefice with low to medium cost
TimeLine: 5 years
Projected Resources: County, local resources, and unidentified outside resources
Responsible Party: Montgomery County, City of Mount Ida
Mitigation Action adopted by: Montgomery County, City of Mount Ida
STAPLEE: Meets all Criteria

Study areas where riparian landslides may occur

Associated Hazard: Landslide
Type of Action: Prevention
Contribution to Mitigation Objective: Reduces the risk due to future landslides
Priority: Low
Rationale for Priority: There has been only one documented landslide in Montgomery County which was caused by flash flooding and was location on US Forest Service Property
Addresses new or existing buildings: New and Existing
Cost Benefit: highly beneficial, little or no expense
TimeLine: 5 years
Projected Resources: Montgomery County and volunteers
Responsible Party: Montgomery County
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Norman, Mount Ida, Oden and School Districts of Caddo Hills, Mount Ida and Ouachita River
STAPLEE: Meets all Criteria

Study areas where wildfires may occur **Associated Hazard: Wildfire** **Type of Action: Prevention** **Contribution to Mitigation Objective:** Reduces the risk due to future wildfire **Priority**: Low **Rationale for Priority**: Increased population creating new wildfire urban interface areas. **Addresses new or existing buildings:** New and Existing **Cost Benefit:** highly beneficial, little or no expense **TimeLine:** 5 years **Projected Resources**: Montgomery County and volunteers **Responsible Party**: Montgomery County **Mitigation Action adopted by:** Montgomery County, Cities of Black Springs, Norman, Mount Ida, Oden and School Districts of Caddo Hills, Mount Ida, and Ouachita River **STAPLEE**: Meets all Criteria
Establish school survey procedures and guidance documents to inventory structural and non-structural hazards in and around school buildings. **Associated Hazard**: Earthquake, Landslide, Tornado Type of Action: Prevention **Contribution to Mitigation Objective:** Actions will keep problems from getting worse/ containment of objects that could become flying missiles during storm event Priority: High Rationale of Priority: Past storm events Addresses New or Existing buildings: New and Existing **Cost Benefit:** Highly beneficial with minimum cost **TimeLine**: 1 years **Projected Resources**: Existing State, County, and City resources. **Responsible Party**: Montgomery County, Cities of Black Springs, Mount Ida, Norman and Oden and the school districts of Caddo Hills, Mount Ida, and Ouachita River. **Mitigation Action adopted by:** Montgomery County, Cities of Black Springs, Mount Ida, Norman and Oden and the school districts of Caddo Hills, Mount Ida, and Ouachita River. **STAPLEE**: Meets all Criteria
Conduct countywide community NFIP workshops for newly elected officials and the public Associated Hazard: Flood event **Type of Action**: Public education and awareness **Contribution to Mitigation Objective:** Educate residents on the need for flood insurance and ensure newly elected officials are knowledgeable so they can assist residents Priority: High Rationale of Priority: Past storm events Addresses New or Existing buildings: New and Existing **Cost Benefit:** Highly beneficial with minimum cost **TimeLine**: 2 years **Projected Resources**: FEMA F-679 online free brochures **Responsible Party:** Montgomery County Flood Plain Manager **Mitigation Action adopted by:** Montgomery County, Cities of Black Springs, Norman, Mount Ida, Oden **STAPLEE**: Meets all Criteria

Install surge protection, lightning protection devices on all communications infrastructure and critical facilities.

Associated Hazard: Lightning
Type of Action: Property protection
Contribution to Mitigation Objective: Guard critical communication equipment from lightning strikes
Priority: High
Rationale of Priority: past events
Addresses New or Existing buildings: New and existing
Cost Benefit: Beneficial, cost to owners of communications infrastructure and critical facilities
TimeLine: 5 years
Projected Resources: Existing County, City, and unidentified outside resources
Responsible Party: Montgomery County, Cities of Black Springs, Mount Ida, Norman and Oden and the school districts of Caddo Hills, Mount Ida, and Ouachita River.
Mitigation Action adopted by: Montgomery County, Cities of Black Springs, Mount Ida, Norman and Oden and the school districts of Caddo Hills, Mount Ida, and Ouachita River.
STAPLEE: Meets all Criteria

Mitigate future losses by regulating development in wildfire hazard areas through land use planning and address density and quantity of development, as well as emergency access, landscaping, and water supply

Associated Hazard: Wildfire
Type of Action: Prevention
Contribution to Mitigation Objective: Reduces the risk of wildfire due to land use
Priority: High
Rationale of Priority: past wildfire events
Addresses New or Existing buildings: Existing
Cost Benefit: Highly beneficial with low cost
TimeLine: 2 years
Projected Resources: Publish notice in paper at minimum expense
Responsible Party: Montgomery County Quorum Court
Mitigation Action adopted by: Montgomery County
STAPLEE: Meets all Criteria

SECTION 6 Acronyms

ADA	Average Daily Attendance
ADEM	Arkansas Department of Emergency Management
BCA	Benefit-Cost Analysis
BMPs	Best Management Practices
CFR	Code of Regulations
CRS	Community Rating System
DMA 2000	Disaster Mitigation Act of 2000
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
FIS	Flood Insurance Study
GIS	Geographic Information System
HMC	Hazard Mitigation Committee
HMGP	Hazard Mitigation Grant Program
IBC	Internal Building Code
FR	Final Rule
LEPC	Local Emergency Planning Committee
MOU	Memorandum of Understanding
NFIP	National Flood Insurance Program
PDM	Pre-Disaster Mitigation Program
PGA	Peak Ground Acceleration
SHMO	State Hazard Mitigation Officer
STAPLEE	Social, Technical, Administrative, Political, Legal,
UCC	Uniform Construction Code
WUI	Wildland Urban Interface
CCOEM	County Office of Emergency Management

SECTION 7 RESOLUTION/ADOPTION

The following county, cities and school districts will submit and adopted resolutions after FEMA has approved the 2024 Montgomery County Hazard Mitigation Plan.

SECTION 8 SUPPORTING DOCUMENTS

8.1 Sample Questionnaire

Name: _____

Email: _____

Please indicate the municipality you reside in: _____

Campuses you visit (select all that apply):

- South Montgomery County School District ☐
- Nemo Vista School District ☑
- Riverview Baptist Christian School ☐
- Sacred Heart Catholic School ☐
- South Montgomery County School District ☐
- University of Arkansas – Morrilton ☐
- Wonderview School District ☐

Are you responding as a:

- Citizen ☐
- Community Organization ☐
- Company ☐
- Local Jurisdiction ☐
- School Administrator ☐
- UA Morrilton ☐

Have you ever experienced or been impacted by a disaster? (select all that apply)

Dam Failure	☐
Drought	☐
Earthquake	☐
Extreme Heat	☐
Flood	☐
Mud/Landslide	☐
Thunderstorm (Including High Winds/Lightning/Hail)	☐
Tornado	☐
Wildfire	☐
Wind	☐
Winter storm	☐
None	☐

How concerned are you about the possibility of your neighborhood being impacted by a disaster?

Very concerned	☐
Somewhat concerned	☐
Not concerned	☐

Please explain your answer:

Is your home located in a FEMA designated floodplain?

Yes ☐

No ☐

Unknown ☐

Do you have flood insurance on your home?

Yes ☐

No ☐

Unknown ☐

If you do not have flood insurance, why not?

What is the most effective way for you to receive information about protecting your family and preparing your home from hazard events?

Email ☐

Mail ☐

Public or School Meetings/Workshops ☐

Radio ☐

Social Media ☐

Television ☐

Other (explain): _____

Please rank the following hazards according to the degree of threat faced by your community. One (1) represents the highest/greatest threat and ten (10) represents the lowest/least threat.

Hazards	List Hazards from highest threat to lowest
Tornado	1.
Winter Storm	2.
Thunderstorm (Including High Winds/Lightning/Hail)	3.
Extreme Heat	4.
Wildfire	5.
Flood	6.
Drought	7.
Dam Failure	8.
Earthquake	9.
Mud/Landslide	10.

Is there another natural hazard that is a threat that was not listed in the previous question?

Have you or your community taken any actions to make your home or neighborhood more resistant to hazards?

If you answered yes to the previous question regarding actions to make your home or neighborhood more resistant to hazards, please explain.

Are there specific actions you have taken for the following hazards?

Flood:

Wildfire:

Drought:

Earthquake:

Severe Winter Storm: _____

Thunderstorm (including high winds/lightning/hail): _____

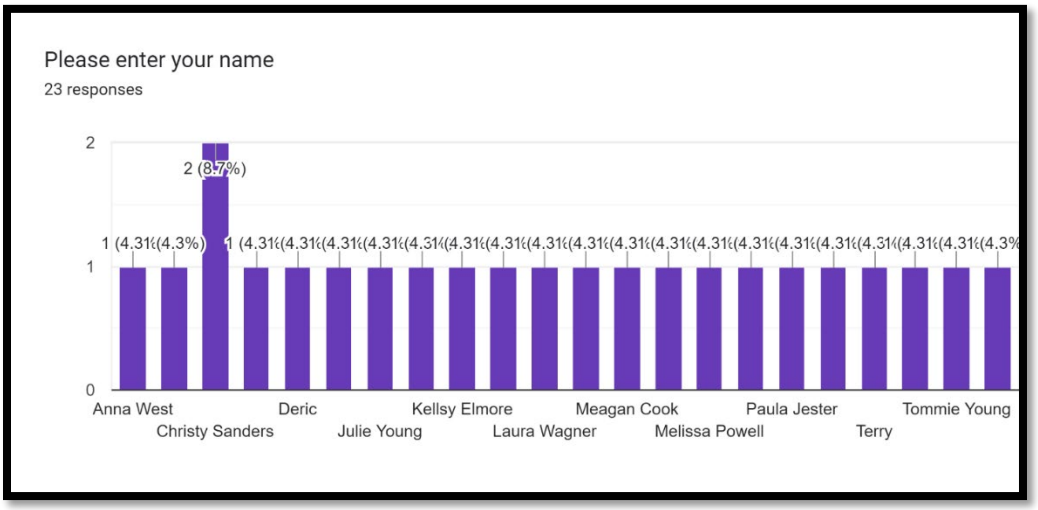
Tornado:

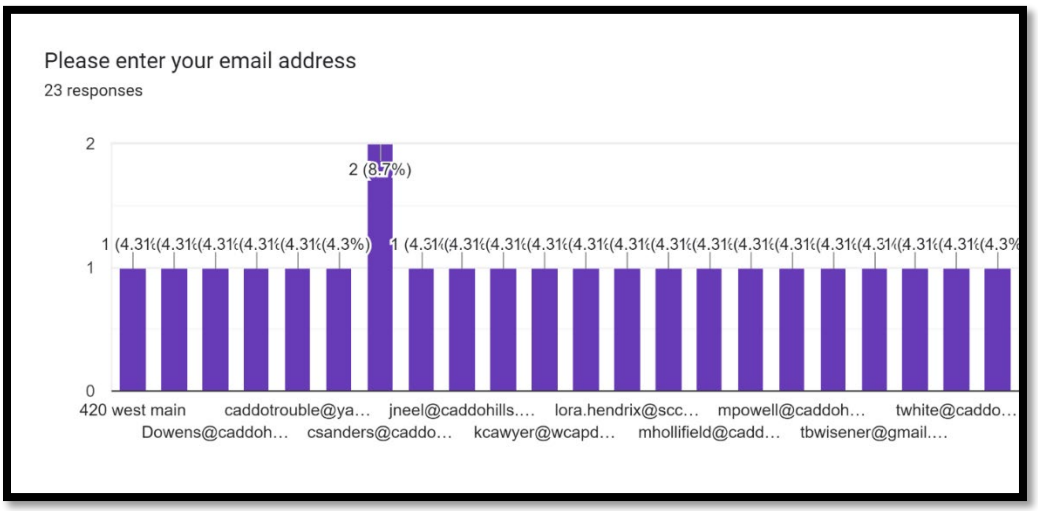
Dam failure: _____

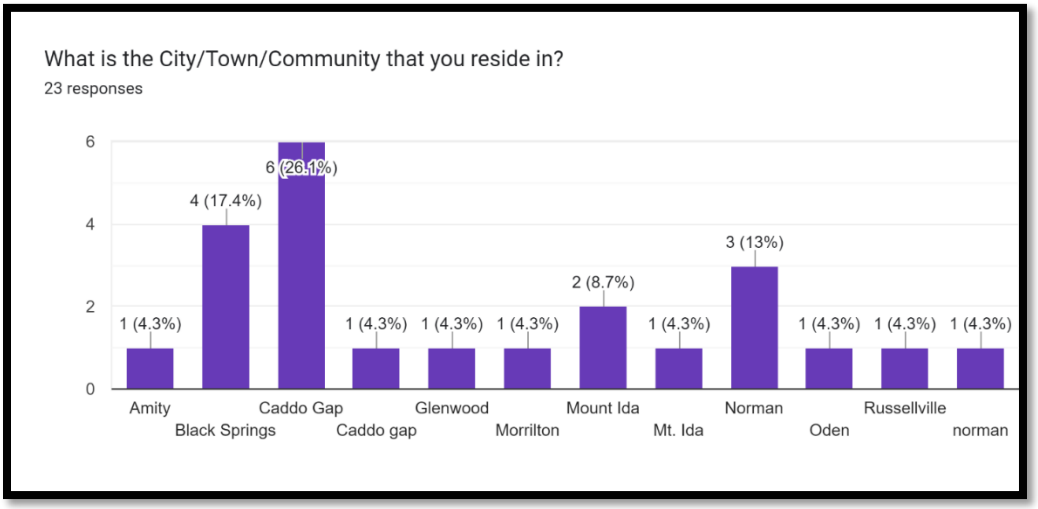
Extreme Heat: _____

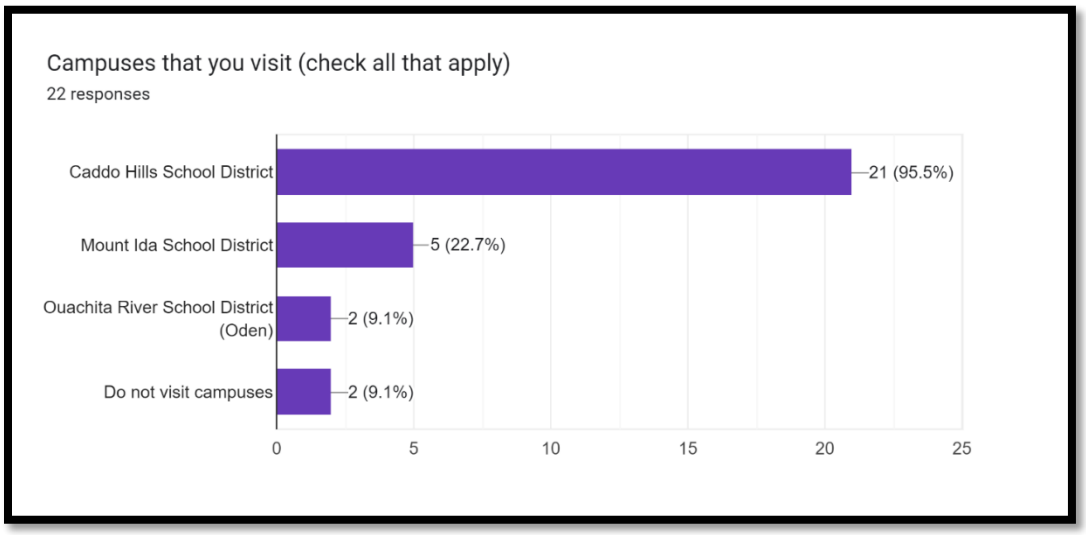
Mud/Landslide: _____

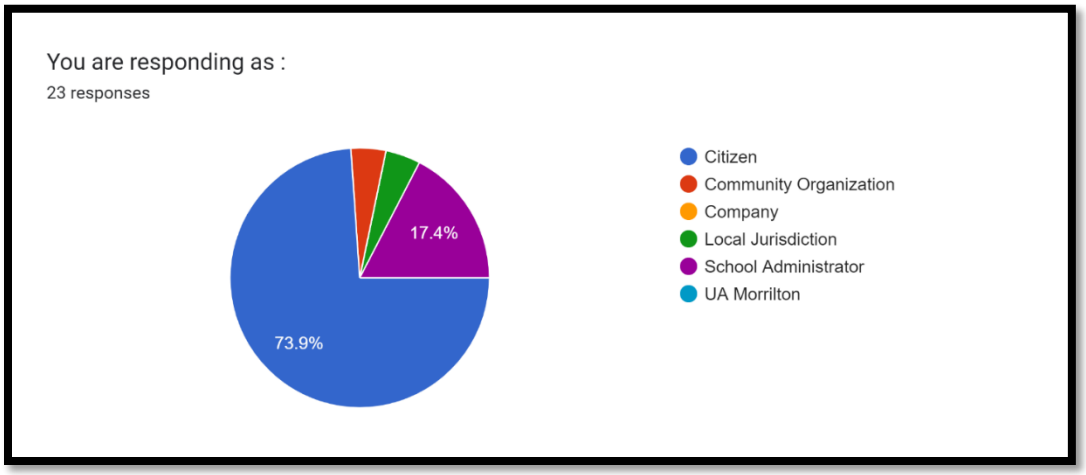
8.2 Questionnaire Reponses

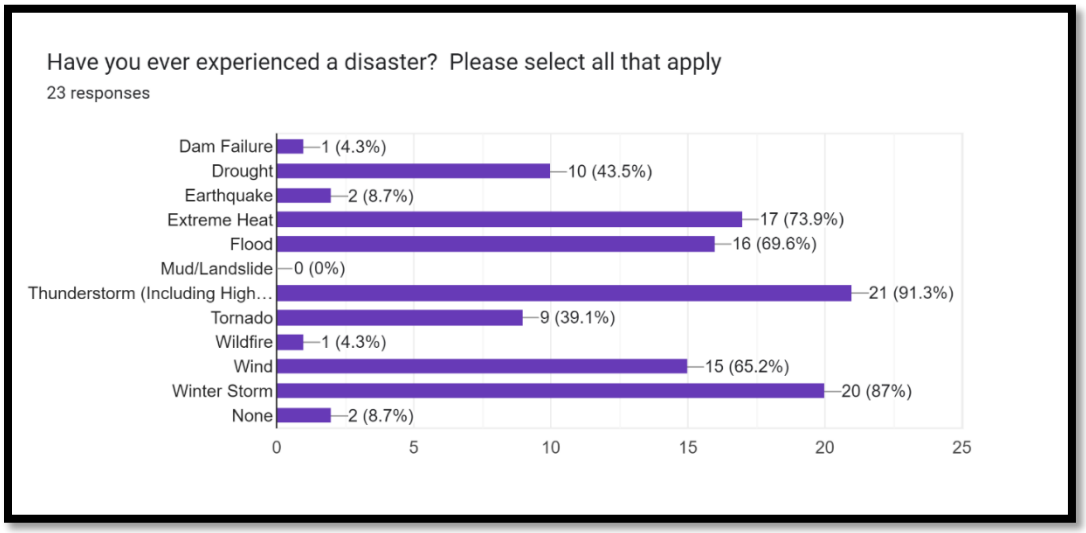


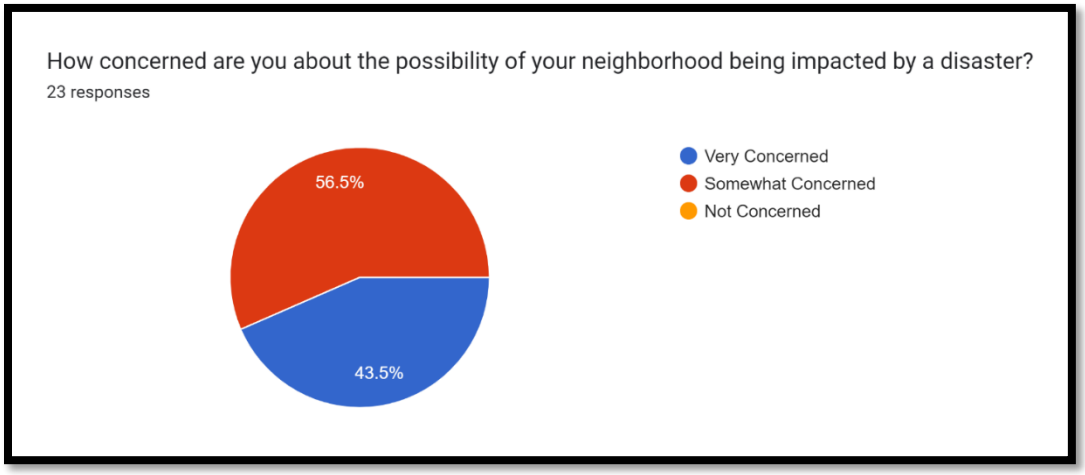





Campuses that you visit (check all that apply)
22 responses
Caddo Hills School District
21 (95.5%)
Mount Ida School District
5 (22.7%)
Ouachita River School District (Oden)
2 (9.1%)
Do not visit campuses
2 (9.1%)
0
5
10
15
20
25


You are responding as :
23 responses
17.4%
73.9%
Citizen
Community Organization
Company
Local Jurisdiction
School Administrator
UA Morrilton

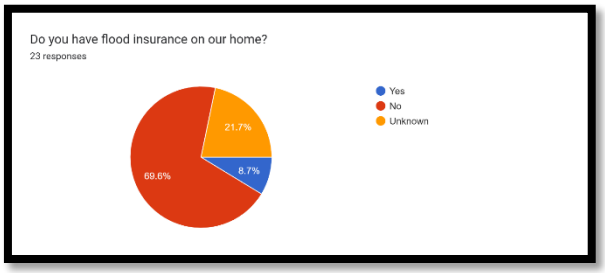

Have you ever experienced a disaster? Please select all that apply
23 responses
Dam Failure
1 (4.3%)
Drought
10 (43.5%)
Earthquake
2 (8.7%)
Extreme Heat
17 (73.9%)
Flood
16 (69.6%)
Mud/Landslide
0 (0%)
Thunderstorm (Including High…
21 (91.3%)
Tornado
9 (39.1%)
Wildfire
1 (4.3%)
Wind
15 (65.2%)
Winter Storm
20 (87%)
None
2 (8.7%)
0
5
10
15
20
25

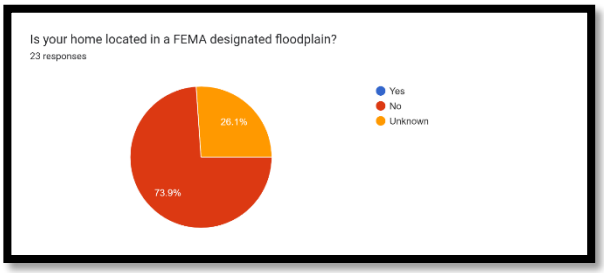


Briefly explain your response to the previous question.
19 responses

- Hard for schools to deal with tornados and the educational process after having building destroyed
- My neighborhood has some elderly people that would possibly struggle after a disaster
- We have to cross rivers and creeks to get to our house. The highway 240 floods when it rains, and we have been flooded in at our house before. There was a tornado that blew trees down just on the other side of 240 from where we live.
- I want to be prepared if we are in an emergency.
- I live 5 miles from the highway. The ice storm of 2020 took out our power and took 11 days to restore. If we have major damage, it may be days or weeks before things are remotely normal for us.
- We have a farm and have experienced the River flood our farm. We experienced the ice storm damaging our buildings, pipes, and fences. Drought has caused us to sell a portion of our cattle.
- Natural disasters
- There is always a small concern for what might happen and if our infrastructure would be able to handle it. I am particularly concerned that we do not have a tornado shelter in our community.
- This area has had a lot of tornados, and one could impact us at any time. We also have a history of bad winter storms with no power and heat.
- worry for the older people in my community.
- We live right next to the National Forest so wildfires are a concern, and our roof has suffered hail damage, and we have a lot of trees around us that could be toppled by high winds.
- Concerns breed preparation. It is only a healthy level of concern to keep prepared for whatever may happen.
- We have land on the Caddo (not the land our home is on) and it floods 2-3 times a year. High winds, hail and tornados are always a concern where we live.
- There is always a possibility of a disaster.
- Minimal secure structures for safety during storms.

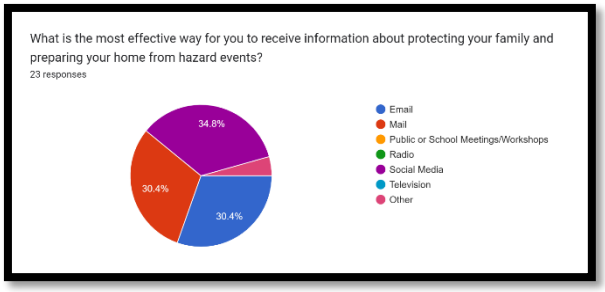
- The ice storm of 2000 seriously impacted my property, toppling many trees and causing power outage for several days. Flooding on my property happens many times every year costing me lots of money in driveway and yard repairs. Winds blow down limbs and may blow down trees. As weather becomes more severe in the future, these storms will cause increasing damage.
- NA
- I worry how people will get help.
- Would like to be as proactive as we can be as a community

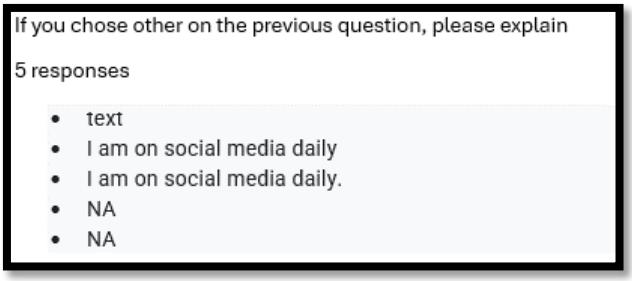




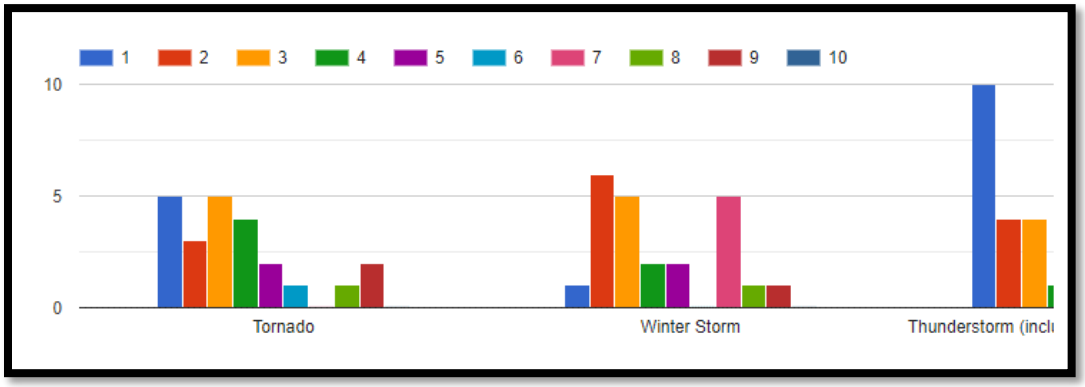
If you do not have flood insurance, why not?
17 responses

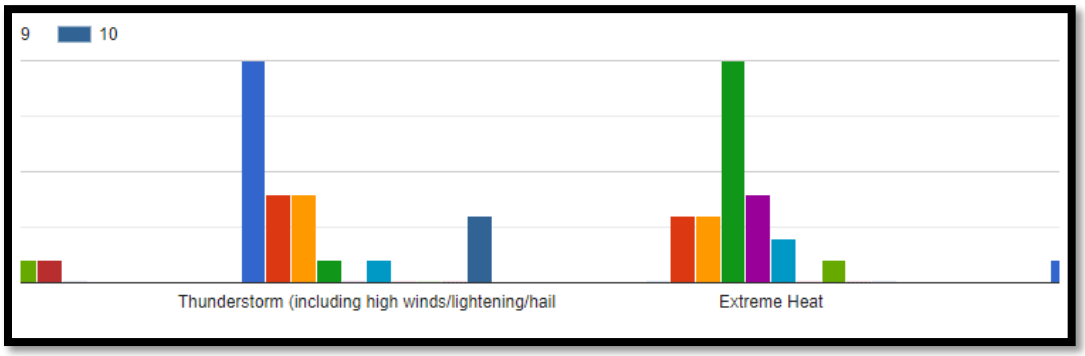
- Not needed
- I live on a really tall hill
- Our house sits on a hill
- Our home is not in danger of being destroyed by flood.
- Wasn't recommended
- Not in flood prone area
- I live in a rental house.
- n/a
- I think it is covered under my homeowner insurance.
- Where my house sits, I should not have to worry about it flooding
- In the 45 years my family has owned the home we live in, the Caddo has never risen enough to be near my home. We live uphill, .25 miles from it.
- I do not live in a floodplain area.
- My family has been in this home for 45 years and has never experienced a flood in our home. We live well above the Caddo flood plain, even though we are only .25 miles from the river.
- Renter
- Insurance is expensive
- Not necessary

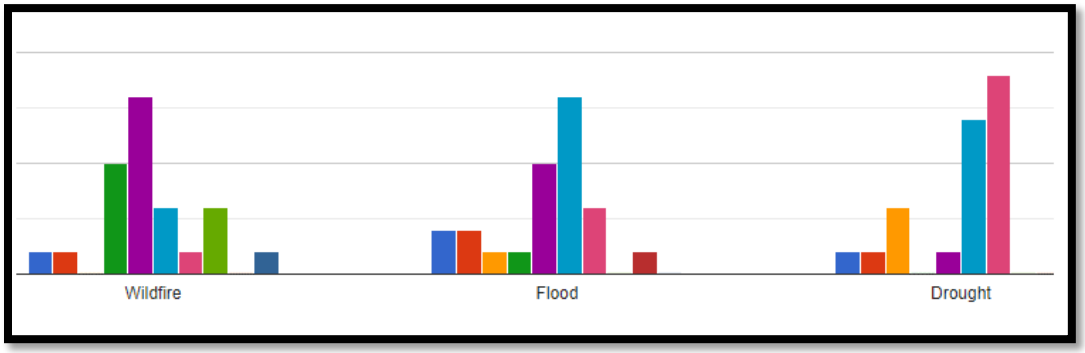


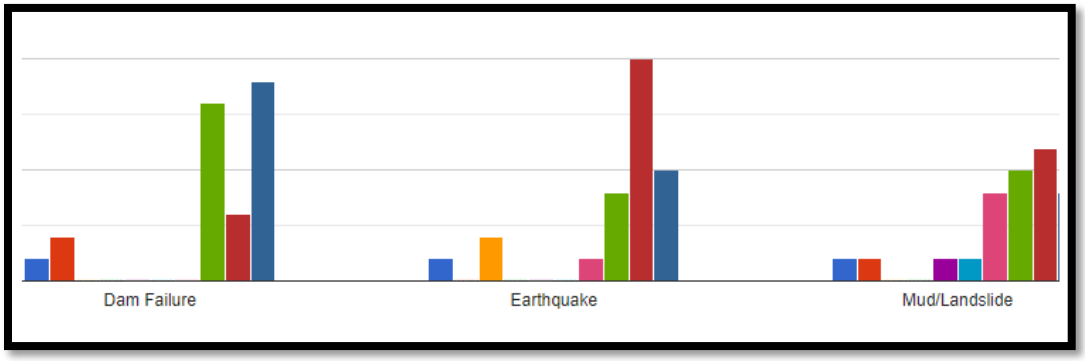


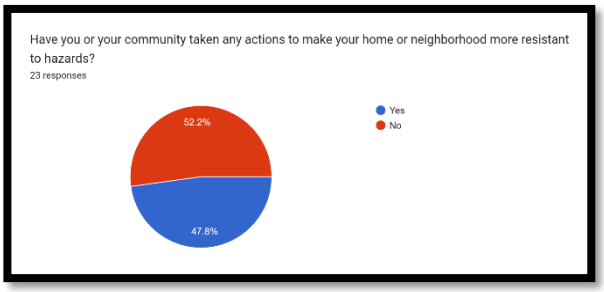
Please rank the following hazards according to the degree of threat faced by your community. One (1) represents the highest/greatest threat and ten (10) represents the lowest/least threat (**note you will not see column 9 and 10. There is a scroll at the bottom of this box to get to those columns. Each row and each column must have a rating and can only use each number one time**).











If you answered yes to the previous question regarding actions to make your home or neighborhood more resistant to hazards, please explain.
11 responses

- education and community plan
- Insulation
- Storm cellar cleaning and preparation
- drains for flooding
- Metal roof on my home. Trees and limbs are kept trimmed back from power lines. I have had some trees removed from my yard, near my house. I also have some food and water stocked, as well as propane stove and heater in case of power outage during winter. I do not have a back-up generator.
- Cleared trees from around the house.
- Built a safe room for family and neighbors.
- Trimmed trees and removed trees close to home to reduce threat
- Generator at home and at the Pharmacy
- NA
- Safe rooms

What are the specific actions you have taken for a Flood?
21 responses

- NA
- Na
- I live on the side of a mountain
- N/a
- n/a

- Try to keep proper drainage near house.
- N/A
- Not building a home on the part of our land on the Caddo that floods.
- Not building a home on the part of our land that the Caddo River that floods.
- None

What are the specific actions you have taken for a wildfire?
21 responses

- NA
- Na
- Most of the area around me is rock
- Brush/trees are kept far away from our house.
- N/a
- Cut back trees near home
- n/a
- None, not sure what I could do to deter it.
- Removed some trees near to my house. Keep the ground clean, mowed and raked near the house.
- N/A
- Rake leaves
- None
- clear brush around the house and keep area clean

What are the specific actions you have taken for a Drought?
21 responses

- NA
- Na
- None
- N/a
- Burn bans and mindful of water usage
- n/a
- None. Looking into rain barrels.
- Stored water.
- N/A

What are specific actions you have taken for an Earthquake?
21 responses

- NA
- Na
- none
- N/a
- n/a
- N/A

- None

What are specific actions taken for a Severe Winter Storm?
21 responses

- NA
- Making sure trees/limbs are trimmed near home and power lines. Having a generator ready.
- Hook up generator clean debris
- Alternate source of heat, food and water storage,
- extra food, water, generator
- We have gas infrared heaters and a gas cookstove.
- Prepare as much as possible by insulating
- Na
- 2 generators, lots of blankets, food in freezer and pantry
- Water supply, filling up the propane tank, storage box with supplies and food for a few weeks
- n/a
- We have a wood stove in the house and a generator
- Mentioned above. Propane stove, heater, and propane bottles stocked. Fireplace in home. Insulated pipes and well.
- N/A
- built safe room
- Weather radio
- Generator at home and at the Pharmacy
- generators

What are specific actions you have taken for a Thunderstorm (including high winds/lightning/hail)?
21 responses

- NA
- Clear debris
- NA
- none
- NA
- NA
- Carports to protect vehicles
- NA
- None. Need some of my trees trimmed...no money to have it done.
- Removed some trees from grounds near house.
- NA
- Making sure trees/limb near our home and power lines are trimmed. Having a generator ready because we lose power frequently during storms.
- built safe room

- Making sure trees/limb near our home and power lines are trimmed. Having a generator ready because we lose power frequently during storms.
- Weather radio
- Generator at home and at the Pharmacy
- generator

What are specific actions you have taken for a Tornado?
20 responses

- NA
- NA
- designated place to go take shelter with blankets, pillows, food, water, battery operated radio and charging station for phones
- none. need a tornado shelter
- Cellar
- created a tornado plan
- Storm cellar cleaning and preparation. A supply box that stays in the storm cellar.
- NA
- Action plan.
- NA
- Having a basement.
- built safe room
- We have a basement.
- Weather radio
- Generator at home and at the Pharmacy

What are specific actions you have taken for a Dam Failure?
21 responses

- NA
- NA
- NA
- NA
- NA
- NA
- None

What are specific actions you have taken for Extreme Heat?
21 responses

- NA
- None
- NA
- NA
- none

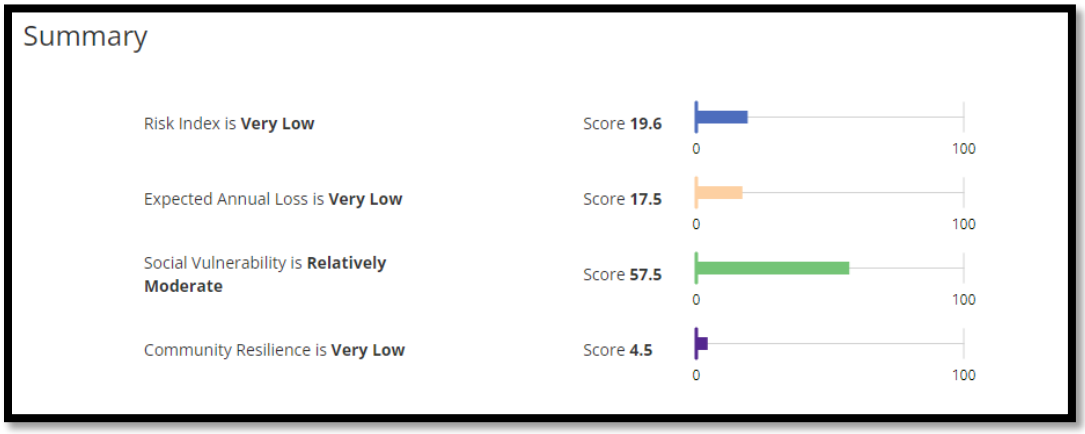
- Stay inside, hydrate
- foil on the windows, staying inside, hydration
- NA
- NA
- Air conditioning and extra insulation

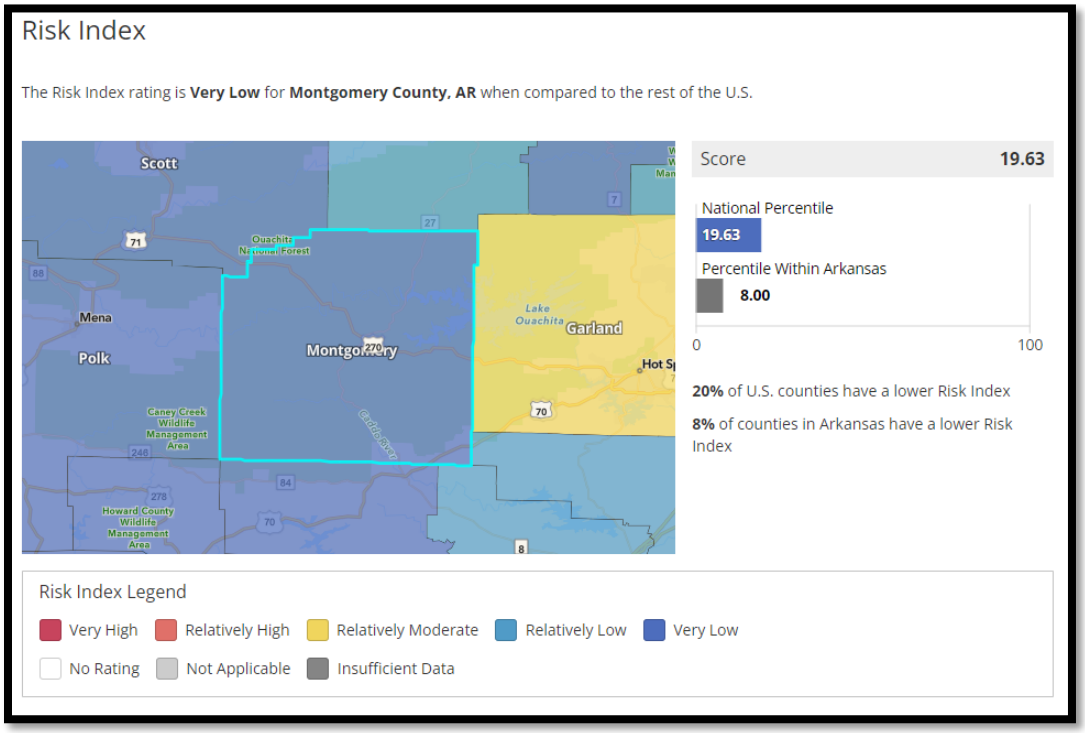
What are specific actions you have taken for a Mud/Landslide?
21 responses

- NA
- NA
- NA
- NA
- NA
- N/A
- Not building a home on the part of our land on the Caddo that floods.
- Not building a home on the part of our land that the Caddo that floods.
- None

8.3 National Risk Assessment Report

For full report: [Community Report - Montgomery County, Arkansas | National Risk Index (fema.gov)]





Hazard Type Risk Index

Hazard type Risk Index scores are calculated using data for only a single hazard type, and reflect a community's Expected Annual Loss value, community risk factors, and the adjustment factor used to calculate the risk value.

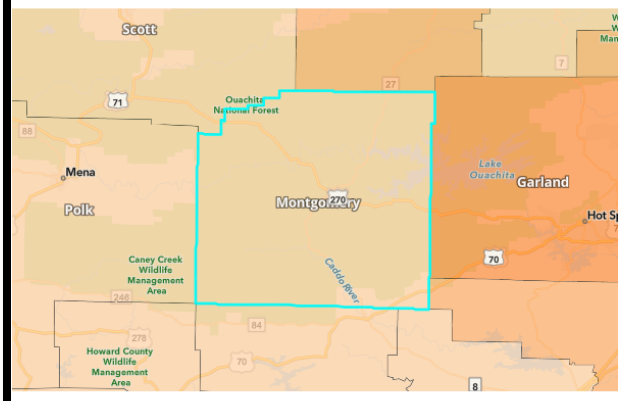
Hazard Type	Risk Index Rating	Risk Index Score	National Percentile
Avalanche	Not Applicable	--	
Coastal Flooding	Not Applicable	--	
Cold Wave	Relatively Low	44.9	0 100
Drought	No Rating	0	0 100
Earthquake	Very Low	45.6	0 100
Hail	Very Low	21.3	0 100
Heat Wave	Relatively Low	48.7	0 100
Hurricane	Very Low	26.8	0 100
Ice Storm	Relatively Low	50.4	0 100
Landslide	Relatively Low	56.8	0 100
Lightning	Relatively Low	40.3	0 100
Riverine Flooding	Relatively Low	59.2	0 100
Strong Wind	Relatively Moderate	60	0 100
Tornado	Relatively Low	37.8	0 100
Tsunami	Not Applicable	--	
Volcanic Activity	Not Applicable	--	
Wildfire	Very Low	54.7	0 100
Winter Weather	Relatively Moderate	63.6	0 100

Risk Factor Breakdown

Hazard Type	EAL Value	Social Vulnerability	Community Resilience	CRF	Risk Value	Risk Index Score
Tornado	$593,131	Relatively Moderate	Very Low	1.27	$747,773	37.8
Riverine Flooding	$556,978	Relatively Moderate	Very Low	1.27	$719,190	59.2
Strong Wind	$411,689	Relatively Moderate	Very Low	1.27	$518,054	60
Earthquake	$94,630	Relatively Moderate	Very Low	1.27	$119,548	45.6
Winter Weather	$78,943	Relatively Moderate	Very Low	1.27	$100,554	63.6
Heat Wave	$62,043	Relatively Moderate	Very Low	1.27	$79,499	48.7
Lightning	$59,409	Relatively Moderate	Very Low	1.27	$76,488	40.3
Ice Storm	$52,874	Relatively Moderate	Very Low	1.27	$66,832	50.4
Wildfire	$43,738	Relatively Moderate	Very Low	1.27	$55,115	54.7
Cold Wave	$34,272	Relatively Moderate	Very Low	1.27	$43,908	44.9
Hurricane	$29,097	Relatively Moderate	Very Low	1.27	$36,299	26.8
Landslide	$21,900	Relatively Moderate	Very Low	1.27	$28,075	56.8
Hail	$20,532	Relatively Moderate	Very Low	1.27	$25,673	21.3
Drought	$0	Relatively Moderate	Very Low	1.27	$0	0
Avalanche	--	Relatively Moderate	Very Low	1.27	--	--
Coastal Flooding	--	Relatively Moderate	Very Low	1.27	--	--
Tsunami	--	Relatively Moderate	Very Low	1.27	--	--
Volcanic Activity	--	Relatively Moderate	Very Low	1.27	--	--

Expected Annual Loss

In **Montgomery County, AR**, expected loss each year due to natural hazards is **Very Low** when compared to the rest of the U.S.



Score **17.49**

National Percentile
17.49

Percentile Within Arkansas
8.00

0 100

17% of U.S. counties have a lower Expected Annual Loss

8% of counties in Arkansas have a lower Expected Annual Loss

Expected Annual Loss Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low

No Expected Annual Losses | Not Applicable | Insufficient Data

Composite Expected Annual Loss	**$2,059,235.15**
Composite Expected Annual Loss Rate National Percentile	**58.3**

Building EAL	**$1,129,480.25**	Population EAL	**0.08** fatalities
Building EAL Rate	**$1 per $1.58K of building value**	Population EAL Rate	**1 per 110.37K people**
Agriculture EAL	**$38,391.68**	Population Equivalence EAL	**$891,363.22**
Agriculture EAL Rate	**$1 per $829.76 of agriculture value**		

Expected Annual Loss for Hazard Types

Expected Annual Loss scores for hazard types are calculated using data for only a single hazard type, and reflect a community's relative expected annual loss for only that hazard type.

14 of 18 hazard types contribute to the expected annual loss for **Montgomery County, AR**.

Hazard Type	Expected Annual Loss Rating	EAL Value	Score
Tornado	Relatively Low	$593,131	38.8
Riverine Flooding	Relatively Low	$556,978	57.4
Strong Wind	Relatively Moderate	$411,689	58.7
Earthquake	Very Low	$94,630	43.8
Winter Weather	Relatively Moderate	$78,943	62.3
Heat Wave	Relatively Low	$62,043	48.8
Lightning	Relatively Low	$59,409	37.9
Ice Storm	Relatively Low	$52,875	48.9
Wildfire	Very Low	$43,738	52.1
Cold Wave	Relatively Low	$34,272	45.2
Hurricane	Very Low	$29,097	25.0
Landslide	Relatively Low	$21,900	29.6
Hail	Very Low	$20,532	22.5
Drought	No Expected Annual Losses	$0	0.0
Avalanche	Not Applicable	--	--
Coastal Flooding	Not Applicable	--	--
Tsunami	Not Applicable	--	--
Volcanic Activity	Not Applicable	--	--

Expected Annual Loss Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$34,272	$155	$33,713	0.00	$404
Drought	$0	n/a	n/a	n/a	$0
Earthquake	$94,630	$71,695	$22,935	0.00	n/a
Hail	$20,532	$141	$764	0.00	$19,627
Heat Wave	$62,043	$30	$61,997	0.01	$16
Hurricane	$29,097	$25,072	$179	0.00	$3,845
Ice Storm	$52,874	$49,359	$3,515	0.00	n/a
Landslide	$21,900	$4,500	$17,400	0.00	n/a
Lightning	$59,409	$9,377	$50,031	0.00	n/a
Riverine Flooding	$556,978	$374,624	$170,019	0.01	$12,336
Strong Wind	$411,689	$223,667	$187,997	0.02	$25
Tornado	$593,131	$257,019	$335,410	0.03	$701
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$43,738	$40,222	$3,473	0.00	$42
Winter Weather	$78,943	$73,619	$3,929	0.00	$1,395

Exposure Values

Hazard Type	Total	Building Value	Population Equivalence	Population	Agriculture Value
Avalanche	--	--	--	--	--
Coastal Flooding	--	--	--	--	--
Cold Wave	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745
Drought	$0	n/a	n/a	n/a	$0
Earthquake	$100,203,439,000	$1,789,039,000	$98,414,400,000	8,484.00	n/a
Hail	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745
Heat Wave	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745
Hurricane	$99,737,528,525	$1,782,770,706	$97,923,460,593	8,441.68	$31,297,227
Ice Storm	$100,168,675,213	$1,789,075,213	$98,379,600,000	8,481.00	n/a
Landslide	$54,320,723,066	$945,430,898	$53,375,292,168	4,601.32	n/a
Lightning	$100,168,675,213	$1,789,075,213	$98,379,600,000	8,481.00	n/a
Riverine Flooding	$2,600,278,447	$53,265,056	$2,544,830,014	219.38	$2,183,378
Strong Wind	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745
Tornado	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745
Tsunami	--	--	--	--	--
Volcanic Activity	--	--	--	--	--
Wildfire	$5,291,444,810	$81,950,710	$5,208,004,630	448.97	$1,489,470
Winter Weather	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745

Winter Weather	$100,200,530,958	$1,789,075,213	$98,379,600,000	8,481.00	$31,855,745

Annualized Frequency Values

Hazard Type	Annualized Frequency	Events on Record	Period of Record
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	0.1 events per year	1	2005-2021 (16 years)
Drought	19.5 events per year	462	2000-2021 (22 years)
Earthquake	0.055% chance per year	n/a	2021 dataset
Hail	5.6 events per year	191	1986-2021 (34 years)
Heat Wave	0.6 events per year	9	2005-2021 (16 years)
Hurricane	0 events per year	3	East 1851-2021 (171 years) / West 1949-2021 (73 years)
Ice Storm	0.8 events per year	56	1946-2014 (67 years)
Landslide	0 events per year	0	2010-2021 (12 years)
Lightning	96.1 events per year	2,115	1991-2012 (22 years)
Riverine Flooding	1.6 events per year	39	1996-2019 (24 years)
Strong Wind	4.1 events per year	139	1986-2021 (34 years)
Tornado	0.5 events per year	15	1950-2021 (72 years)
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	0.134% chance per year	n/a	2021 dataset
Winter Weather	1.5 events per year	24	2005-2021 (16 years)

Historic Loss Ratios

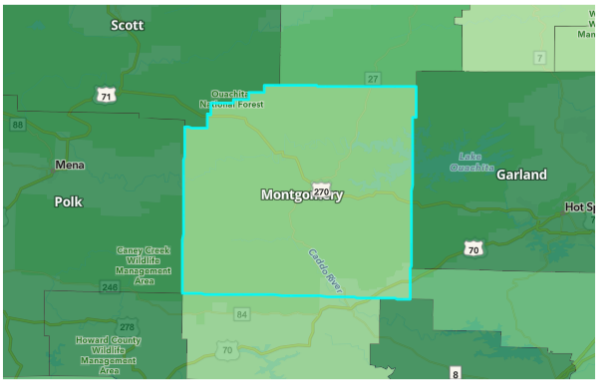
Hazard Type	Overall Rating
Avalanche	--
Coastal Flooding	--
Cold Wave	Relatively Low
Drought	No Rating
Earthquake	Relatively Moderate
Hail	Very Low
Heat Wave	Relatively Low
Hurricane	Relatively Low
Ice Storm	Relatively Low
Landslide	Relatively Low
Lightning	Relatively Low
Riverine Flooding	Relatively Low
Strong Wind	Relatively Moderate
Tornado	Relatively Moderate
Tsunami	--
Volcanic Activity	--
Wildfire	Relatively Low

Expected Annual Loss Rate

Hazard Type	Building EAL Rate (per building value)	Population EAL Rate (per population)	Agriculture EAL Rate (per agriculture value)
Avalanche	--	--	--
Coastal Flooding	--	--	--
Cold Wave	$1 per $11.52M	1 per 2.92M	$1 per $78.84K
Drought	--	--	--
Earthquake	$1 per $24.95K	1 per 4.29M	--
Hail	$1 per $12.68M	1 per 128.77M	$1 per $1.62K
Heat Wave	$1 per $60.16M	1 per 1.59M	$1 per $1.98M
Hurricane	$1 per $71.36K	1 per 548.13M	$1 per $8.28K
Ice Storm	$1 per $36.25K	1 per 27.98M	--
Landslide	$1 per $397.57K	1 per 5.65M	--
Lightning	$1 per $190.79K	1 per 1.97M	--
Riverine Flooding	$1 per $4.78K	1 per 578.64K	$1 per $2.58K
Strong Wind	$1 per $8.00K	1 per 523.30K	$1 per $1.25M
Tornado	$1 per $6.96K	1 per 293.31K	$1 per $45.42K
Tsunami	--	--	--
Volcanic Activity	--	--	--
Wildfire	$1 per $44.48K	1 per 28.32M	$1 per $759.04K
Winter Weather	$1 per $24.30K	1 per 25.04M	$1 per $22.84K

Social Vulnerability

Social groups in **Montgomery County, AR** have a **Relatively Moderate** susceptibility to the adverse impacts of natural hazards when compared to the rest of the U.S.



Score **57.45**

National Percentile
57.45

Percentile Within Arkansas
32.00

0 100

57% of U.S. counties have a lower Social Vulnerability

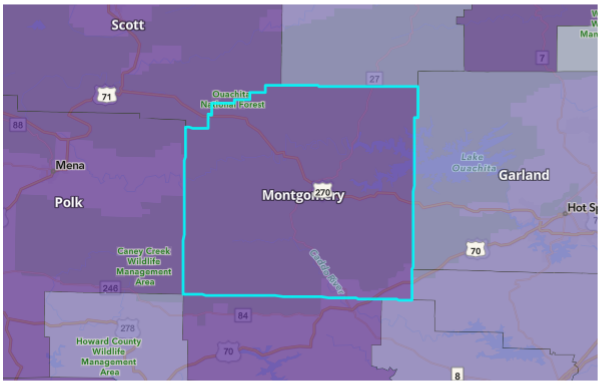
32% of counties in Arkansas have a lower Social Vulnerability

Social Vulnerability Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable

Community Resilience

Communities in **Montgomery County, AR** have a **Very Low** ability to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions when compared to the rest of the U.S.



Score **4.46**

National Percentile
4.46

Percentile Within Arkansas
8.00

0 100

96% of U.S. counties have a higher Community Resilience

92% of counties in Arkansas have a higher Community Resilience

Community Resilience Legend

Very High | Relatively High | Relatively Moderate | Relatively Low | Very Low | Data Unavailable